Appendix A

Historical Reports

Northwest Boundary Area RCRA Facility Investigation
Fort Buchanan, Puerto Rico

#744

DRXTH-AS-IA-82329A

INSTALLATION ASSESSMENT OF FORT BUCHANAN, P.R.
REPORT NO. 329A

B.N. McMaster, S.R. Hearne, S.A. Denahan, A.P. Hubbard, K.L. Hatfield, K.C. Govro, M.A. Hobel, and K.A. Civitarese

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Prepared for:

COMMANDER
Fort McPherson
Fort McPherson, Ga. 30330

and

U.S. ARMY TOXIC AND HAZARDOUS MATERIALS AGENCY
Assessments Division
Aberdeen Proving Ground, Md. 21010

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INSTALLATION ASSESSMENT

OF

FORT BUCHANAN, PR

Report No. 329A

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20. ABSTRACT (Continue on reverse side if necessary and identify by block number)

An onsite installation assessment was conducted Aug. 30 to Sept. 3, 1982, at Fort Buchanan (FTB), P.R., to determine the presence of any toxic or hazardous material and to assess the potential for offpost migration. Based on the findings of this assessment, a limited contaminant assessment was recommended. This limited assessment was conducted Apr. 18 to 24, 1983, to provide additional information on the pesticide burial site. Based on the findings of the second assessment, no field survey was recommended.

SUMMARY

An onsite installation assessment was conducted Aug. 30 to Sept. 3, 1982, at Fort Buchanan (FTB), P.R., to determine past and current use of toxic and hazardous materials, as well as the potential for these substances to migrate off the installation.

Several problem areas were identified during the onsite assessment.

Reportedly, 1 ton of unidentified pesticides was buried in a shallow trench near the northern installation boundary in 1977. Due to the potential for migration of these compounds, a limited contamination assessment was performed.

The following handling or waste disposal practices, while not leading to offpost migration, are not in compliance/conformance with designated regulations or guidelines:

1. The existing pesticide storage facilities (Bldg. 138 and a shed adjacent to Bldg. 556) and mixing areas (adjacent to Bldgs. 138 and 556) lack facilities (e.g., continuous curbing) to control spillage. In addition, the shed adjacent to Bldg. 556 lacks facilities (e.g., walls) to ensure that pesticides remain dry. Pesticides are improperly stored in the Entomology Office area of Bldg. 556 (USAEHA, 1975a; EPA, 1982f). Subsequent to the site visit, funding reportedly has been approved for the construction of new pest control facilities which will comply with all Federal regulations. Bids are to be solicited in the near future.
2. A survey of in-service polychlorinated biphenyl items is currently being conducted; however, approximately only two-thirds of the in-service transformers have been surveyed to date (EPA, 1982e).

3. Three wash racks on FTB and the one on the U.S. Army Reserve Center in Bayamon discharge to the storm sewer system (without National Pollutant Discharge Elimination Service permits). In addition, two wash racks are not equipped with oil/water separators (U.S. Army, 1978; EPA, 1982a).
4. No evidence of contamination was uncovered to adversely affect the excessing of the parcel of land formerly designated as the Army Terminal (extending from Highway 24 to San Juan Bay) and the parcel of land located adjacent to the De Diego Expressway on the northern portion of FTB.

Based on the findings of these assessments, no survey by the U.S. Army Toxic and Hazardous Materials Agency (USATHAMA) was recommended. It was recommended, however, that FTB should:

1. Properly store pesticides,
2. Continue efforts to ensure appropriate marking of in-service transformers in accordance with Federal regulations,
3. Bring the wash racks into compliance with Army and Federal regulations, and
4. Continue with excessing actions as appropriate.

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A	aboveground
AMSA	Areawide Maintenance Support Activity
BOD	biochemical oxygen demand
°C	degrees Celsius
CB	chemical/biological
CERCOM	U.S. Army Communications and Electronics Materiel Readiness Command
cm	centimeters
cm/sec	centimeters per second
CMU	3-p-chlorophenyl-1,1-dimethylurea
COD	chemical oxygen demand
COE	U.S. Army Corps of Engineers
D	diesel fuel
DARCOM	U.S. Army Materiel Development and Readiness Command
DDESB	Department of Defense Explosives Safety Board
DEH	Directorate of Engineering and Housing
DENTAC	U.S. Army Dental Department Activity
DIO	Directorate of Industrial Operations
DO	dissolved oxygen
DPCA	Directorate of Personnel and Community Activities
DPDO	Defense Property Disposal Office
DPTSEC	Directorate of Plans, Training, and Security
dz	dozen
EOD	explosive ordnance disposal
EPA	U.S. Environmental Protection Agency
EQB	Environmental Quality Board
ESE	Environmental Science and Engineering, Inc.
FDA	Food and Drug Administration
FORSCOM	U.S. Army Forces Command
ft	foot

ft^2	square feet
FTB	Fort Buchanan
FTM	Fort McPherson
FY	fiscal year
g	grams
gal	gallons
GC	grit collection
GC/MS	gas chromatography/mass spectroscopy
GSA	General Services Administration
ha	hectares
HF	heating fuel
ID	indoor
IIA	Initial Installation Assessment
in	inches
ISCP	Installation Spill Contingency Plan
JTU	Jackson turbidity units
kg	kilograms
kg/year	kilograms per year
km	kilometers
l	liters
lb	pounds
lpy	liters per year
m	meters
m^3	cubic meters
mm	millimeters
MEDDAC	U.S. Army Medical Department Activity
mg/l	milligrams per liter
ml	milliliters
MOGAS	Motor gas
MSL	mean sea level
NBC	nuclear, biological, or chemical
NIPDWR	National Interim Primary Drinking Water Regulations
NO_2	nitrogen dioxide
NO_3	nitrate

NPDES	National Pollutant Discharge Elimination System
NRC	U.S. Nuclear Regulatory Commission
NSDWR	National Secondary Drinking Water Regulations
OD	outdoor
O/W	oil/water separator
oz	ounces
PCB	polychlorinated biphenyl
pCi/l	picocuries per liter
pck	packages
pcu	platinum cobalt units
POL	petroleum, oils, and lubricants
ppm	parts per million
PRASA	Puerto Rico Aqueduct and Sewage Authority
PRNG	Puerto Rico National Guard
PRPA	Puerto Rico Port Authority
PX	post exchange
RCRA	Resource Conservation and Recovery Act
ROTC	Reserve Officers Training Corps
SOP	standing operating procedure
SPCC	Spill Prevention Control and Countermeasure
STP	sewage treatment plant
TACOM	U.S. Army Tank-Automotive Command
TASC	Training Aids Support Center
TCA	sodium trichloroacetate
THM	trihalomethanes
TKN	total Kjeldahl nitrogen
U	underground
ug/g	microgram per gram
ug/l	micrograms per liter
umhos	micromhos
USADWSP	U.S. Army Drinking Water Surveillance Program
USAEHA	U.S. Army Environmental Hygiene Agency
USAR	U.S. Army Reserve
USATHAMA	U.S. Army Toxic and Hazardous Materials Agency

USDA	U.S. Department of Agriculture
USGS	U.S. Geological Survey
USSCS	U.S. Soil Conservation Service
VA	Veterans Administration
WO	waste oil
WTP	water treatment plant
WWII	World War II

1.0 GENERAL

1.1 PURPOSE OF THE ASSESSMENT

To determine the existence of toxic and hazardous materials and related contamination at Fort Buchanan (FTB), P.R., emphasizing those substances posing a potential for migration off the installation.

1.2 AUTHORITY

U.S. Army Materiel Development and Readiness Command (DARCOM) Regulation 10-30, Mission and Major Functions of the U.S. Army Toxic and Hazardous Materials Agency (USATHAMA), July 30, 1981.

1.3 INTRODUCTION

1. In response to a letter from the Commander, USATHAMA, requesting the identification of potentially contaminated installations, the Commander, U.S. Army Forces Command (FORSCOM), recommended that FTB be included in the Installation Restoration Program.

2. Presurvey instructions were forwarded to FTB by letter to outline assessment scope, provide guidelines to FTB personnel, and obtain advance information for review by the independent Initial Installation Assessment (IIA) Team.

3. FTB personnel were briefed by a USATHAMA representative on the Installation Restoration Program on Aug. 31, 1982.

4. Various Government agencies were contacted for documents pertinent to the records search effort. Agencies contacted include:

a. U.S. Department of Defense Explosives Safety Board (DDESB), Alexandria, Va.;
b. U.S. Army Environmental Hygiene Agency (USAEHA);
c. U.S. Geological Survey (USGS), San Juan, P.R.;
d. U.S. Army Center of Military History;
e. Washington National Records Center, Suitland, Md.;
f. U.S. Soil Conservation Service (USSCS), San Juan, P.R.;
g. National Archives and Record Service, Navy and Old Army Branch and Modern Military Branch, Washington, D.C.;
h. Environmental Quality Board (EQB), San Juan, P.R.; and
i. U.S. Environmental Protection Agency (EPA).

5. The onsite phase of the installation assessment was conducted from Aug. 30-Sept. 3, 1982. The following personnel from Environmental Science and Engineering, Inc. (ESE), under Contract No. DAAK11-81-C-0093, were assigned to the team:
   - Mr. Steve Hearne, Team Leader
   - M-. Steph . Denahan, Hydrogeologist
   - Ms. Karen Hatfield, Chemist
   - Mr. Allen Hubbard, Engineer

6. In addition to the records review, interviews were conducted with current employees. A ground tour of the installation was made, and photographs were taken.

7. Only those facilities potentially involved in the handling, production, testing, and disposal of contaminants were investigated.

8. A limited contamination assessment was performed as a final phase of the initial installation assessment. The onsite phase of this limited contamination assessment was conducted Apr. 18-24, 1983. The information presented in this report is current as of the date of this onsite assessment.

1.4 CURRENT INSTALLATION ORGANIZATION AND MISSION

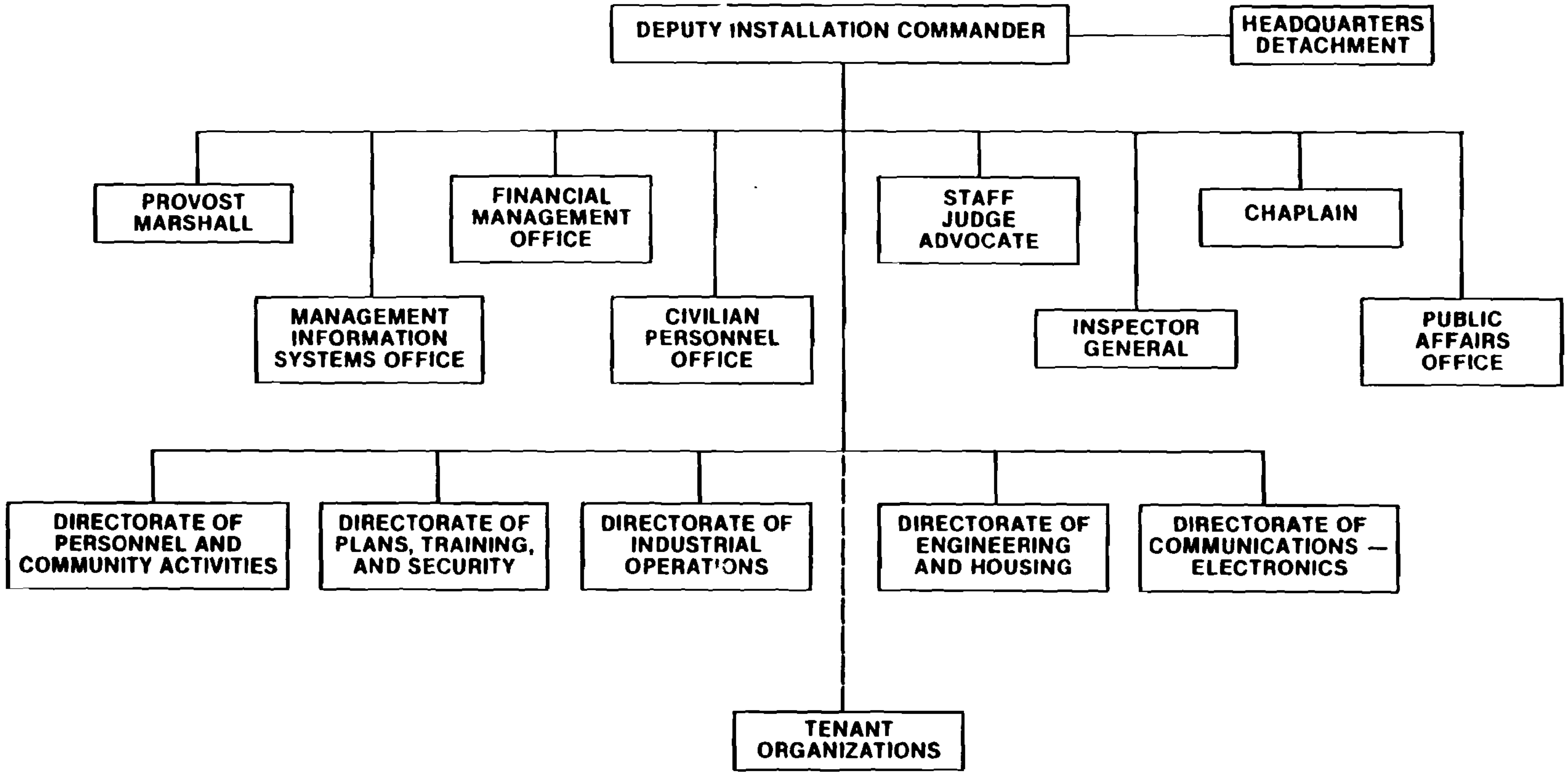
FTB operates as a subinstallation of Fort McPherson (FTM), Ga., under the command of FORSCOM. The mission of FTB is to provide:

1. Administrative and logistical support to Active Army and U.S. Army Reserve (USAR) units in Puerto Rico and the U.S. Virgin Islands,
2. Family housing and community support facilities for service personnel and authorized Federal employees, and
3. Personnel services and community support facilities for retired service personnel and dependents of deceased military personnel.

FTB is organized with a Deputy Installation Commander, who reports directly to the FTM Installation Commander. The current installation organization of FTB is depicted in Fig. 1.4-1.

The following directorates are involved in activities of environmental concern:

1. Directorate of Industrial Operations (DIO)--is responsible for general supply and maintenance; laundry, food, and transportation services; procurement; vehicle maintenance; excess supply disposal; and petroleum, oils, and lubricants (POL) supply.
2. Directorate of Engineering and Housing (DEH)--is responsible for engineering projects and services, master planning and construction programs, real estate management, maintenance and management of physical facilities and utilities, fire protection, environmental and energy control, pest control, refuse collection and disposal, and wildlife conservation.
3. Directorate of Plans, Training, and Security (DPTSEC)--is responsible for unit and individual training, utilization of training facilities, intelligence, ammunition supply, security, Training and Audiovisual Support Center (TASC) activities, and aviation functions.



SOURCE: U. S. Army Garrison, FTB, 1977.

Figure 1.4-1
CURRENT INSTALLATION ORGANIZATION —— FORT BUCHANAN

Prepared for:
U.S. Army Toxic and Hazardous Materials Agency
Aberdeen Proving Ground, Maryland

FTB provides administrative and logistical support to the following tenant organizations:

Post Exchange (PX),
Commissary Store,
Veterinary Services,
Health Clinic,
Antilles Consolidated School System,
Criminal Investigation Detachment,
Defense Investigative Service,
U.S. Army Readiness Group--Puerto Rico,
Senior Army Advisor--USAR,
Senior Army Advisor--Puerto Rico National Guard (PRNG),
Reserve Officer Training Corps (ROTC) Instructor Group, and
166th Support Group--USAR.

Of these tenants, only two engage in activities of environmental concern:

1. Health Clinic--provides medical and dental care to active and retired military personnel and their dependents.
2. Veterinary Services--provides veterinary food inspection, veterinary preventive medicine, zoonotic control, and animal care.

In addition, FTB is responsible for the support of 12 USAR centers and their activities throughout the Commonwealth of Puerto Rico. Direct administration and support are provided by the 166th Support Group, with training assistance provided by the U.S. Army Readiness Group and the Senior Army Advisor--USAR.

1.5 INSTALLATION HISTORY

1.5.1 GENERAL HISTORY

FTB was established as Camp Buchanan in 1923 as a training area for the 65th Infantry Regiment. The site was named in honor of Brigadier General James A. Buchanan, Commander of the Puerto Rico Volunteer

Regiment from 1900 to 1903. The original site was established on approximately 120 hectares (ha) acquired from the Government of Puerto Rico by the Federal Government in fee simple title (Mitchell, 1931; U.S. Army Garrison, FTB, Environmental/Energy Office, 1980).

From 1926 to 1930, Camp Buchanan was used as a range and maneuver training area by the Regular Army, PRNG, and the Citizens Military Training Camp.

By 1940, the post was redesignated Fort Buchanan, a permanent Army post. During World War II (WWII), FTB functioned as a supply depot and troop replacement center for the Army Antilles Command. It was expanded to 607 ha, with a pier for transport and cargo ships, ammunition storage, warehouse areas, maintenance, training, administrative, and post engineering facilities. The post retained its function as a supply and replacement depot throughout the Korean Conflict.

In 1966, the Antilles Command was deactivated, and FTB was closed. The site was transferred to the Navy until 1971 when it was returned to Army control with the primary mission of support for the USAR program in Puerto Rico.

As a result of Army reorganization in 1971, FTB came under command of FORSCOM. On Oct. 1, 1977, FTB became a subinstallation of FTM (U.S. Army Garrison, FTB, Environmental/Energy Office, 1980).

1.5.2 ARCHAEOLOGICALLY AND HISTORICALLY SIGNIFICANT AREAS

Four areas of cultural resources or historical interest have been identified on FTB. These have been tentatively identified as late prehistoric or early historic sites. There are a number of other sites that could yield historic or cultural significance upon further exploration. Sites are generally well away from areas of normal activity or operations (Fundacion Arqueologica, Antropologica e Historica de Puerto

Rico, 1982; U.S. Army Garrison, FTB, Environmental/Energy Office, 1980).

Of the four major areas, two are predominantly of prehistoric significance, and one has been nominated for placement on the National Register of Historic Places (Fundacion Arqueologica, Antropologica e Historica de Puerto Rico, 1982).

1.6 ENVIRONMENTAL SETTING

1.6.1 LOCATION

FTB is located approximately 10 kilometers (km) southwest of the city of San Juan, P.R. (Fig. 1.6-1). The island of Puerto Rico is the easternmost member of the Greater Antilles and is roughly rectangular in shape, being 175 km east-west and 60 km north-south. San Juan is situated on the north coast near the eastern end of the island. FTB lies just south of the municipality of Catano.

1.6.2 METEOROLOGY

The tropical marine climate of the San Juan area is characterized by annual temperature changes of only 3.3 degrees Celsius (°C) (range from 23.9°C to 27.2°C). San Juan receives about 152 centimeters (cm) of rainfall annually with the interior receiving even more. Rio Piedras, about 8 km inland, averages 203 cm of annual precipitation. Rainfall is seasonally distributed with a July to October maximum and a January to April minimum. The prevailing winds are from the east or north east; however, in the fall winds tend to be also from the south and southeast. In addition, Puerto Rico is in the hurricane zone and occasionally experiences severe hurricanes.

1.6.3 GEOGRAPHY

Physiography

FTB is located in the Coastal Lowlands physiographic province. In the San Juan area, the Coastal Lowlands are characterized by a gently sloping plain, about 8 km wide, composed of alluvial materials deposited

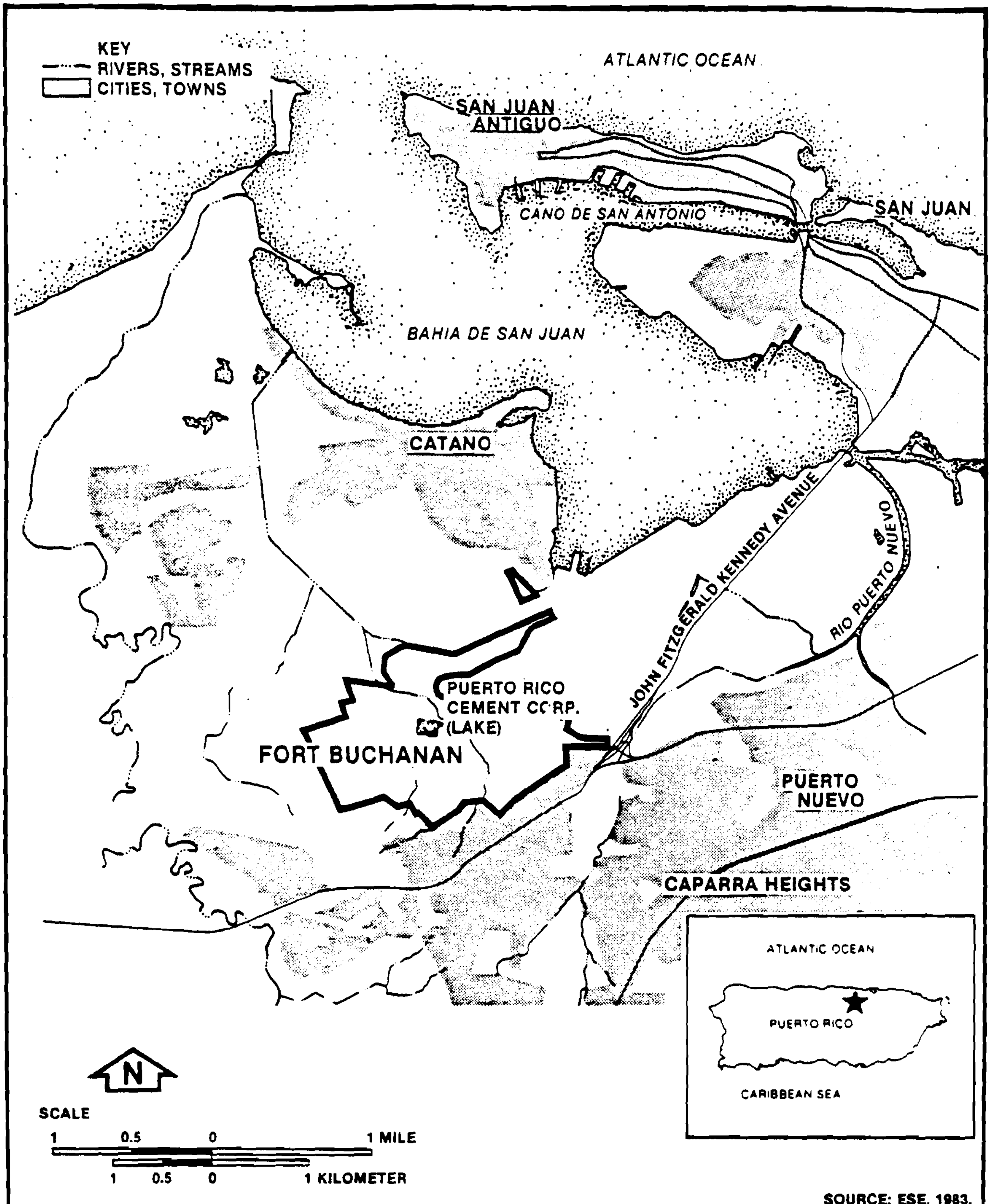


Figure 1.6-1 LOCATION MAP –– FORT BUCHANAN	**Prepared for:** **U.S. Army Toxic and Hazardous Materials Agency** **Aberdeen Proving Ground, Maryland**

over a highly dissected older surface. Remnants of this older surface stand above plain as isolated "haystack hills" or mogotes. Close to the coast lies a line of marshes, swamps, and lagoons. Further inland, the Northern Foothills rise to about 300 meters (m). These rounded hills are composed generally of sandstone, siltstone, and some volcanic rocks. FTB is located on the inland side of the coastal belt of swamps and lagoons. Elevations on the installation range from 2.4 m above mean sea level (MSL) to 50 m MSL, although the mogotes on the northeast boundary rise to 95 m MSL.

Surface Water Hydrology

FTB is drained by El Toro Creek, which discharges into the Malaria Control Canal and then into San Juan Bay (Fig. 1.6-2). El Toro Creek, an open concrete-lined ditch over most of its length, originates just south of the installation in a residential area.

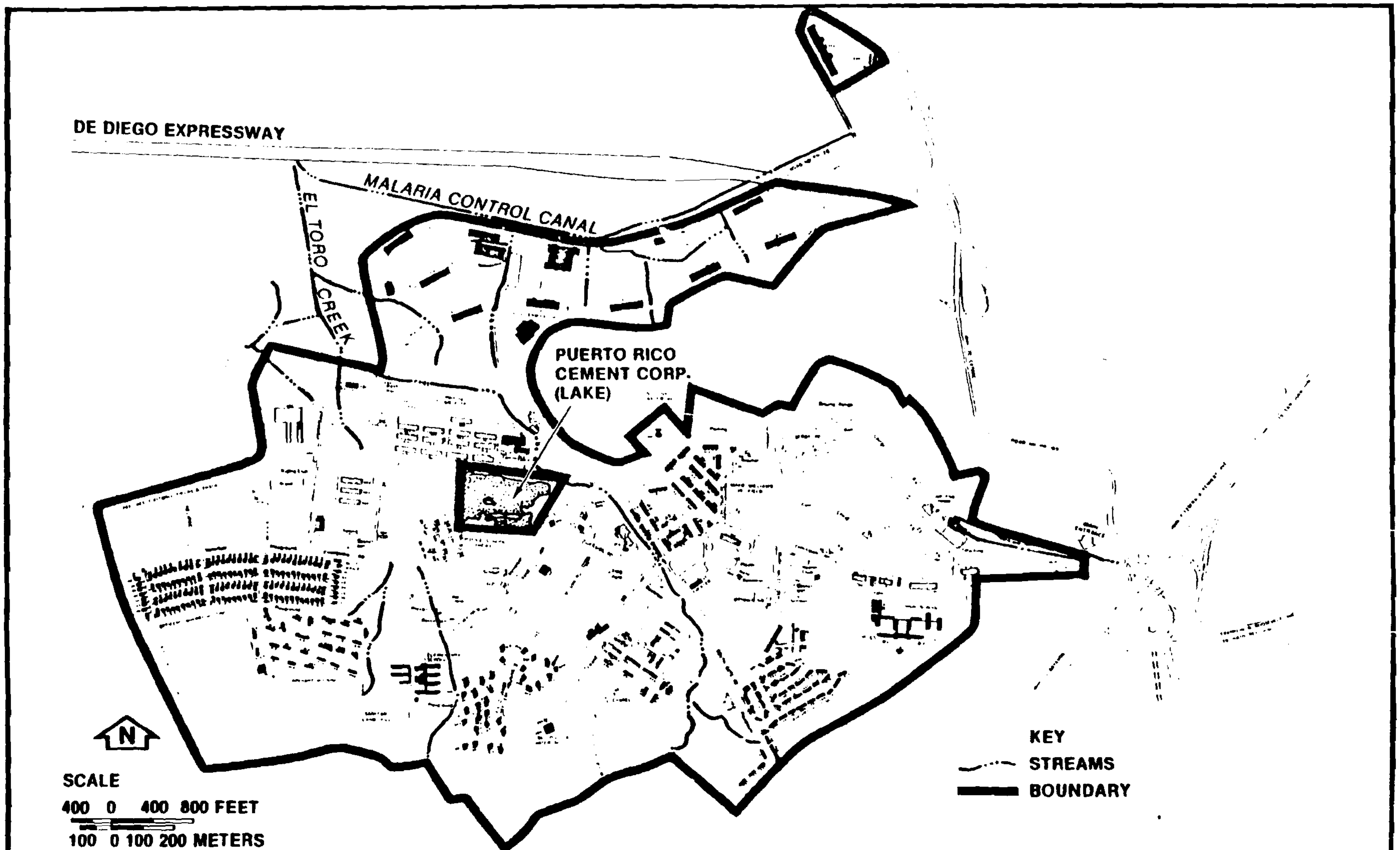
Puerto Rico Cement Corp. Lake is a small (0.8 ha), privately-owned, reportedly spring-fed pond located in the center of FTB. This pond was previously used by the Puerto Rico Cement Corp. for process water supply. Most stormwater runoff onpost is discharged into El Toro Creek, although a small amount goes to the Puerto Rico Cement Corp. Lake.

1.6.4 GEOHYDROLOGY

Geologic Setting

The island of Puerto Rico consists of a core of Cretaceous and younger volcanic rocks flanked on the north and south by Tertiary sedimentary deposits. Along the coast, the Tertiary rocks are blanketed by Quaternary alluvium (Monroe, 1980).

In the San Juan area, the Tertiary sequence is only partially exposed, much of it being covered by up to 30 m of younger alluvium (Anderson, 1976). The formations outcropping in the FTB area include the San Sebastian Formation, the Cibao Formation, the Aguada Limestone, and the Aymamon Limestone (Fig. 1.6-3). These formations range in age from



SOURCE: ESE, 1983.

Figure 1.6-2
SITE MAP —— FORT BUCHANAN

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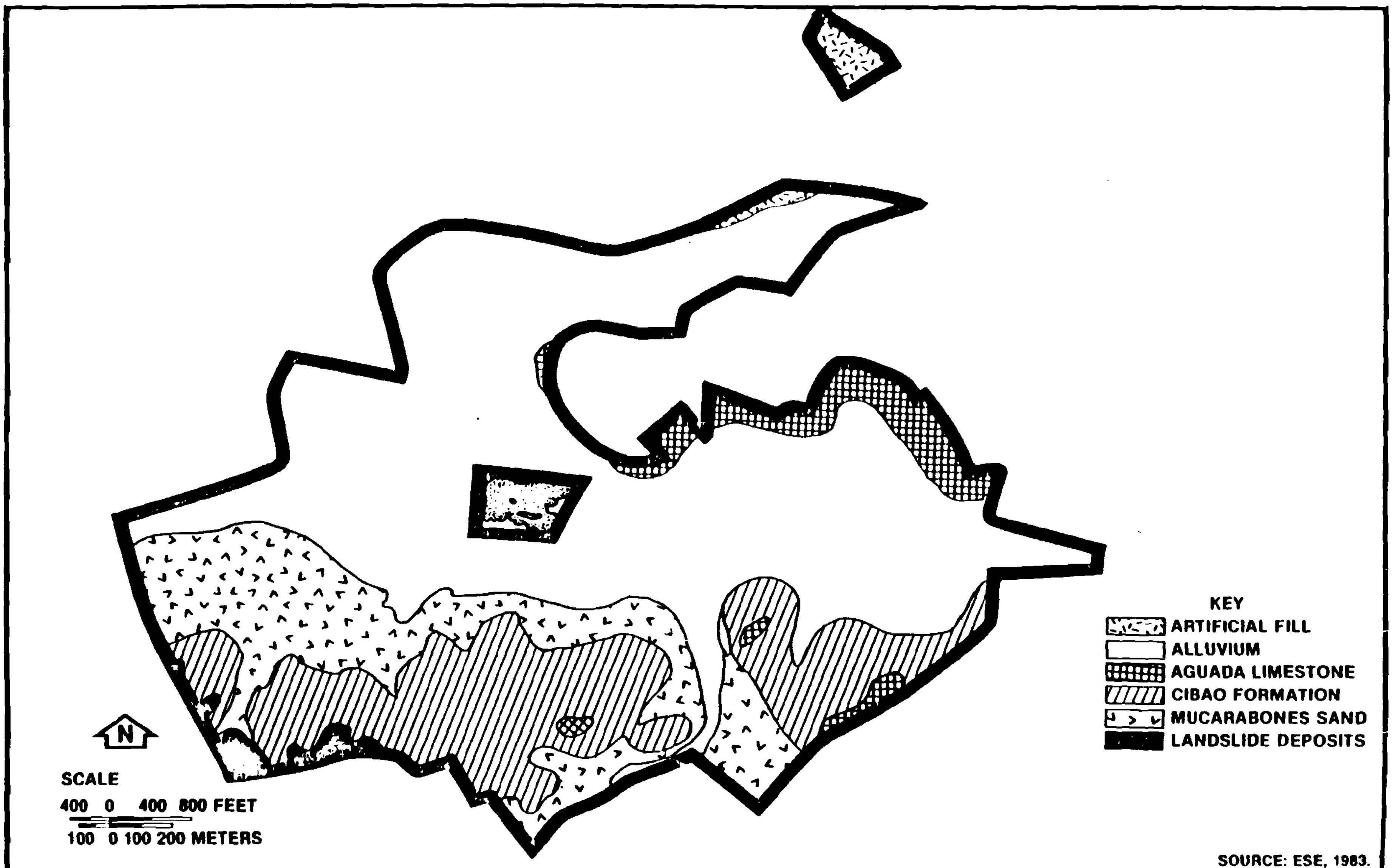

Figure 1.6-3
GEOLOGIC MAP —— FORT BUCHANAN

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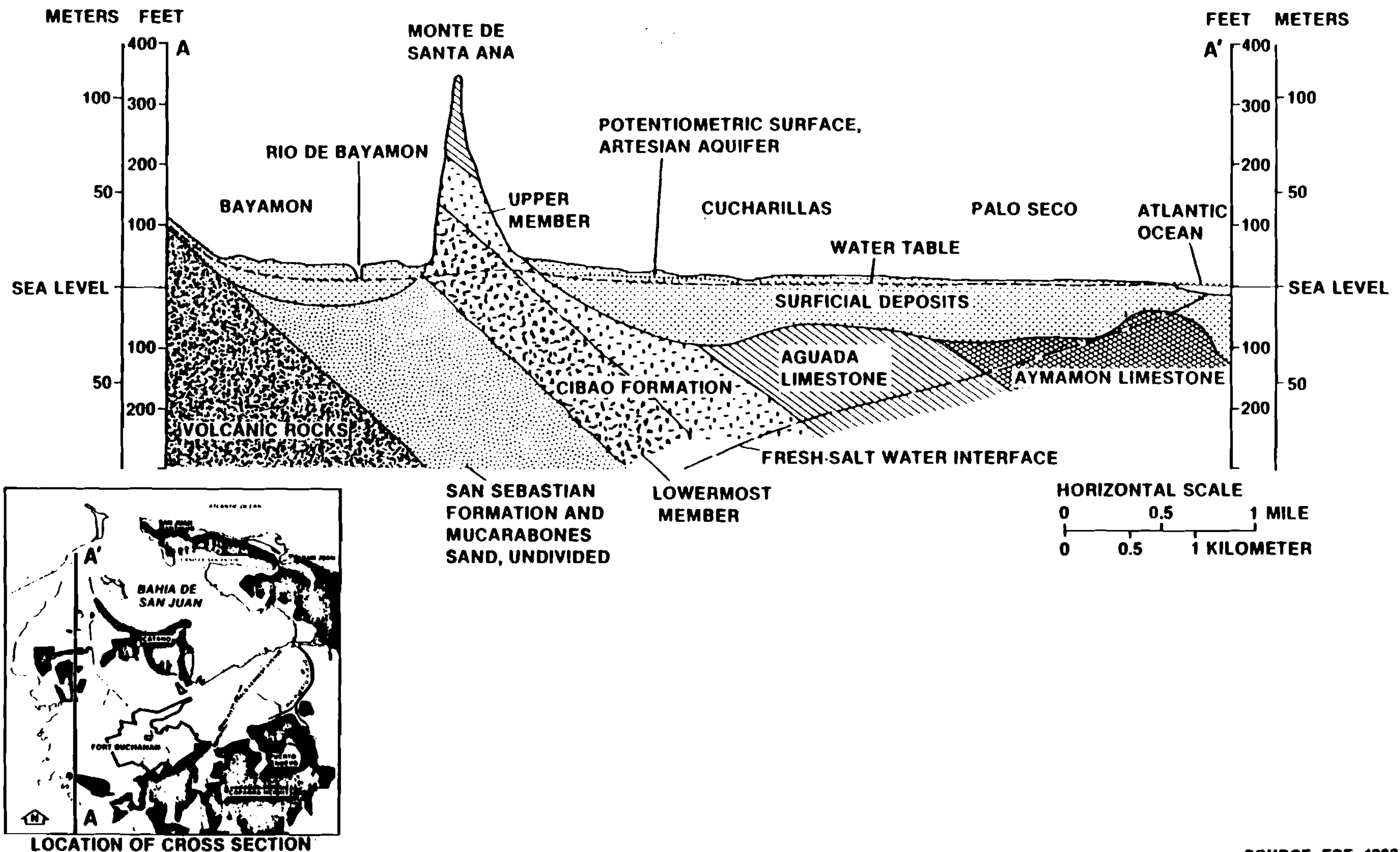
U.S. Army Toxic and Hazardous Materials Agency
Aberdeen Proving Ground, Maryland

Oligocene to Miocene. The Mucarabones Sand, which has been previously mapped as part of the San Sebastian Formation, has recently been shown to be contemporaneous with the lower Cibao Formation. The Aguada and Aymamon Limestones are resistant rocks and tend to form ridges and cap the mogotes. The Cibao and San Sebastian Formations are composed of alternating beds of sand, gravel, limestone, and clay. All of these formations dip and thicken coastward (Fig. 1.6-4).

Most of FTB is covered by Quaternary alluvium, although the Cibao and the Mucarabones outcrop in the southern part of the installation. The mogote, which forms the reentrant in the installation boundary, is composed of Aguada Limestone.

Soils

The predominate variety of soil found on FTB is listed by USSCS as Almirante clay. This well-drained deep clay, which is found on the coastal plains and between the limestone hills, is composed mostly of residual material from the decomposition of limestone. The surface horizons are mostly brown to strong brown, with gradually increasing amounts of red and grey clays below 1 m in depth. This soil is characterized by the presence of plinthite nodules in the subsurface layers, and has a strongly acid reaction. Virtually all of the soil particles in Almirante clay will pass through a #200 [0.074 millimeter (mm)] sieve, and the permeability is low as a result; most precipitation falling upon this soil will run off without percolation. The depth to bedrock and the ground water table is often greater than 10 m, and the soil is high-plasticity mixed clays throughout the entire profile. The risk of flooding is limited to localized surface ponding. This clay is difficult to work with construction machinery or farming implements because of its plasticity and stickiness, and its usefulness as a foundation material is limited by some shrink-swell potential dependent upon moisture content and also by its greatly reduced shear strength when wet.



SOURCE: ESE, 1983.

Figure 1.6-4
GEOLOGIC CROSS SECTION IN THE VICINITY OF FORT BUCHANAN

Prepared for:
U.S. Army Toxic and Hazardous Materials Agency
Aberdeen Proving Ground, Maryland

Ground Water

All of the rocks described in the preceding section function as aquifers in the San Juan area. The Aguada and Aymamon Limestones, along with the upper portions of the Cibao Formation, form a prolific water-table aquifer which extends in a narrow band along the coast. The aquifer's extent is limited by the saltwater interface on the coastal side and by the landward thinning and eventual absence of the limestones. At FTB, these limestones have been mostly removed by erosion, existing only as isolated mogotes.

The San Sebastian and lower portion of the Cibao Formations constitute another aquifer which is under confined conditions in much of the San Juan area. An aquifer test performed on a well located a few kilometers east of FTB yielded a transmissivity of 1,000 square feet (ft^2) per day and a storage coefficient of 1.3×10^{-4}. These values are typical for this aquifer (Anderson, 1976). FTB lies in the recharge zone for this aquifer, since both Mucarabones Sand and Cibao Formation outcrop on the installation. Ground water flow is toward the coast on a regional scale; however, local perturbations certainly exist due to the irregular topography and variable lithology of the sediments.

Wells

Currently, there are no active wells at FTB. Three former wells have been located; one of these has been sealed. The other two wells have been in inactive status since the 1950s. The location of the wells is shown on Fig. 1.6-5.

1.6.5 BIOTA

Although FTB is largely developed (buildings, roads, parking areas), those portions of the installation not yet developed support sizeable areas of natural forest and vegetation, as well as numerous areas of exotic or cultivated plantings. The natural vegetation is extremely dense, with heavy understory. Both the natural and exotic vegetative communities are very rich in species diversity.

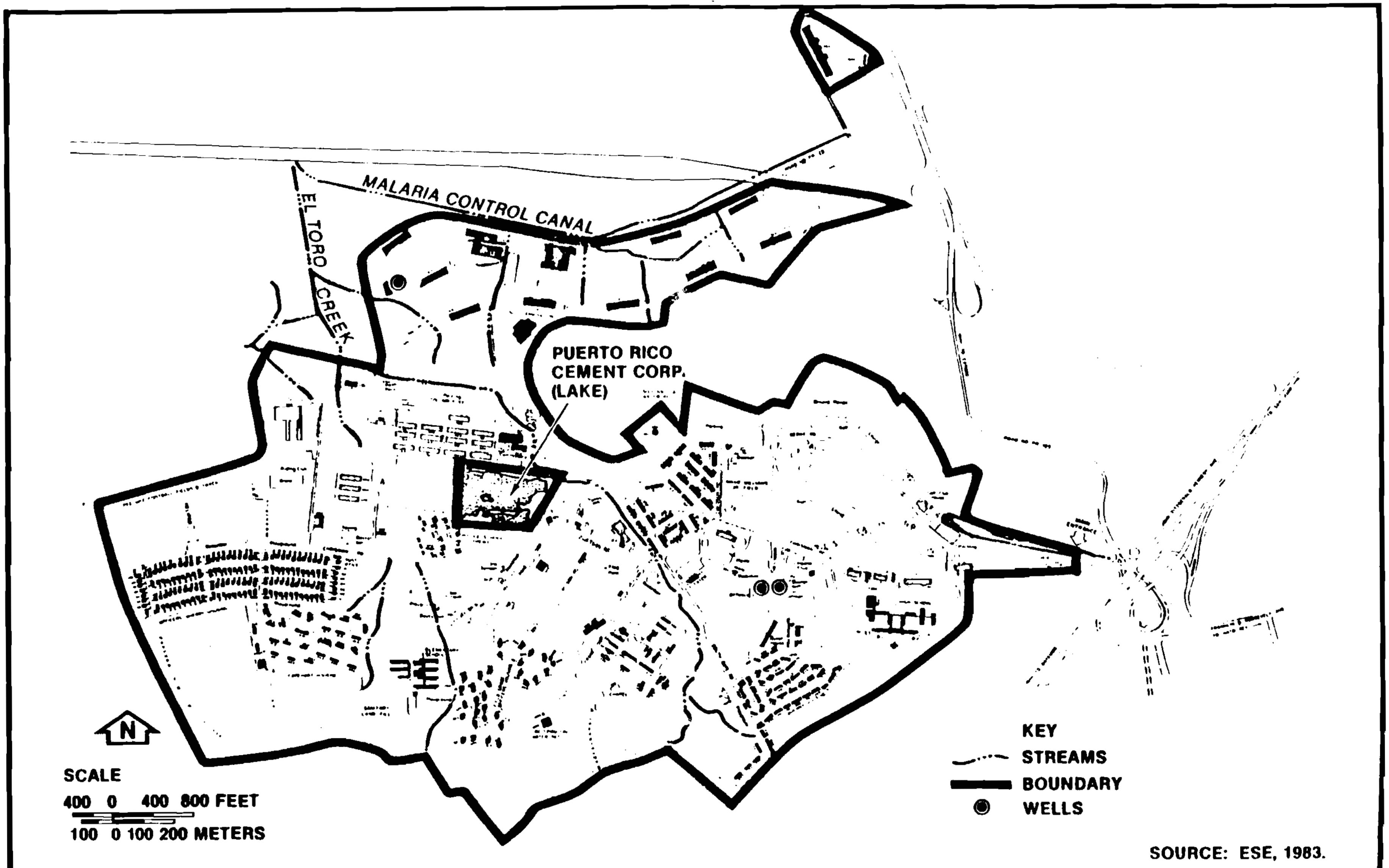


Figure 1.6-5
WELL LOCATIONS —— FORT BUCHANAN

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U.S. Army Toxic and Hazardous Materials Agency
Aberdeen Proving Ground, Maryland

Vegetation on FTB can be generally grouped into two communities according to composition and occurrence on site: (1) low-level open areas, and (2) limestone hills.

The low-level open areas are dominated by grasses and weeds with some shrubs and vines. The limestone hills are generally densely forested with a variety of native and introduced species. The hilltops have been left undisturbed. The flora of the forested hilltops on the south perimeter of FTB include two plant species considered rare and endangered by the U.S. Department of Agriculture (USDA): maga (Monezuma speciosissima) and pedwood (Antirhea portoricensis).

No specific information relative to fish and wildlife resources of FTB have been obtained to date. Diverse natural habitats and exotic plantings are maintained and would provide valuable wildlife habitat especially for birds and small mammals.

El Toro Creek and the Puerto Rico Cement Corp. Lake are the only significant aquatic habitats on the site. The lake supports a limited fishery and has a tendency towards eutrophication (U.S. Army Garrison, FTB, Environmental/Energy Office, 1980). El Toro Creek experiences severe water quality degradation in dry weather as a result of the impact of sewage effluent which originates offpost (U.S. Army Garrison, FTB, Environmental/Energy Office, 1980) (see Sec. 2.3.1).

The only threatened and endangered animal species known to occur on FTB is the Puerto Rican boa (Epicraties inornatus), a Federal endangered species. It is known to inhabit a hilly area north of the golf course, but this area has been placed off limits to protect the species (GRW Engineers, Inc., 1980).

1.7 LEASES AND AGREEMENTS

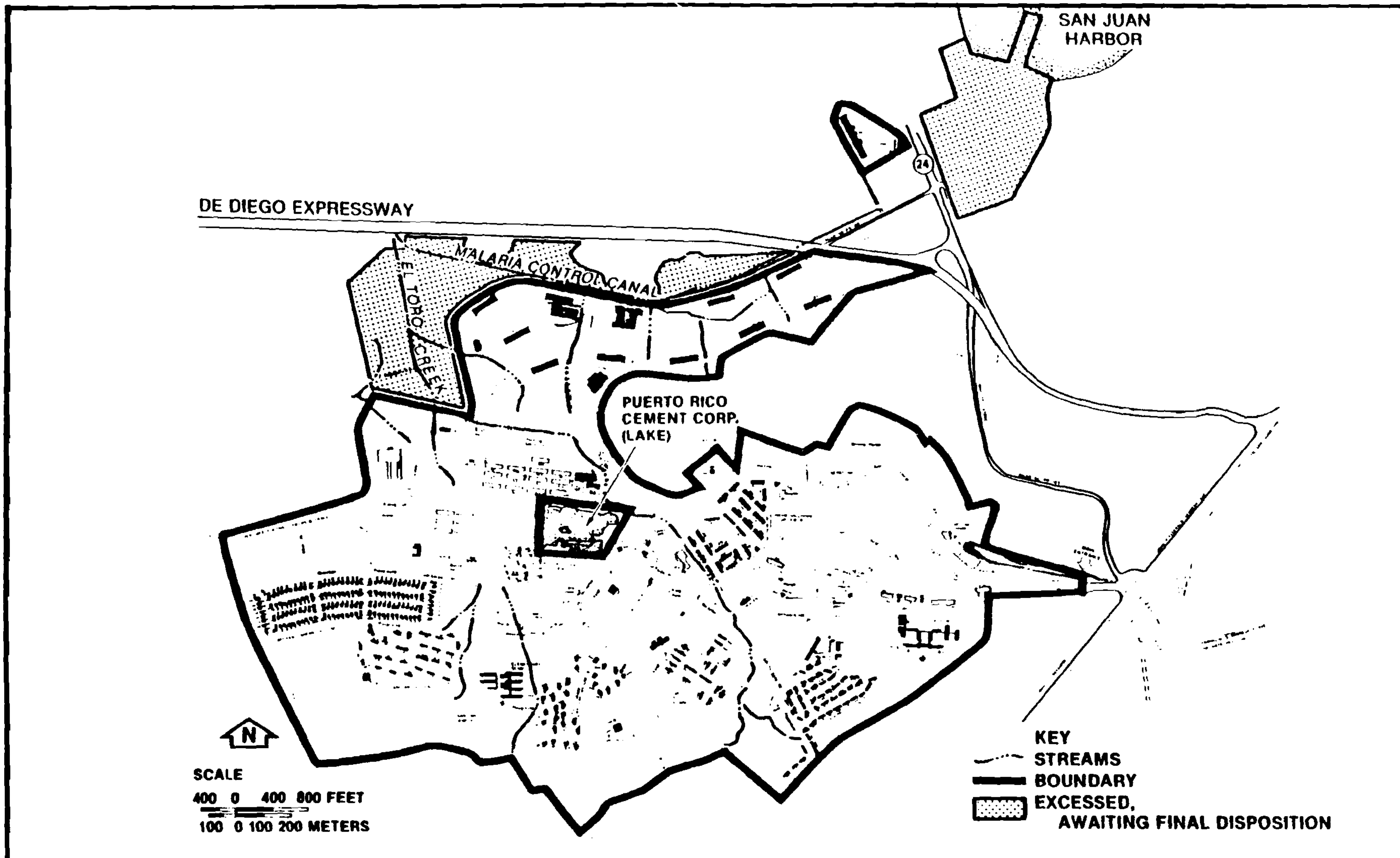
FTB is currently located on 294 ha of land owned by the Federal Government. App. A lists the outgrants currently active on the installation. A majority of the leases, permits, easements, and licenses involving real property of FTB are to utilities and authorize the lessee to right-of-way for pipelines, rails, or utility lines. Others are for the use of buildings and land areas on the installation.

In January 1967, large portions of land were declared excess to be disposed of by the General Services Administration (GSA) (App. A.). Of the original land declared excess, two parcels totalling approximately 41 ha are still awaiting final disposition. These two parcels of land are depicted in Fig. 1.7-1.

One parcel of land encompassing approximately 15 ha, formerly designated as the Army Terminal, extends from near Highway 24 to the San Juan Bay. The terminal was used by the U.S. Army for embarkation and disembarkation of troops and loading/unloading of equipment and supplies from military transport vessels from WWII to 1966. This land was leased to the Puerto Rico Port Authority (PRPA) in 1969, the lease having been extended yearly by supplemental agreements. The current lease allows PRPA to sublease the property (see App. A). Sublessee operations at the Army Terminal currently include the Hapag-Lloyd Shipping Co. and the Rexach Construction Co. These operations are described further in Sec. 2.1.2.

The lease requires PRPA to protect and maintain in good order the property at their expense. In addition, the lease requires PRPA to comply with all applicable laws, ordinances, and regulations of the state, county, and muncipality, with regard to construction, sanitation, licenses or permits to do business, and/or other matters. Although care and custody have been made the responsibility of PRPA, this property is carried on the real property inventory of FTB [U.S. Army Corps of Engineers (COE), Savannah District, 1980].

The second parcel of land declared excess and awaiting final disposition is located adjacent to the De Diego Expressway on the northern portion



SOURCE: ESE, 1983.

Figure 1.7-1
EXCESS LAND AWAITING DISPOSAL -- FORT BUCHANAN

Prepared for:
U.S. Army Toxic and Hazardous Materials Agency
Aberdeen Proving Ground, Maryland

of FTB. This parcel encompasses approximately 26 ha and consists primarily of unimproved wetlands. Reportedly, under GSA procedures, care, custody, and maintenance for this property are borne by the holding department or agency (i.e., FTB). However, costs for property not disposed of within 12 months of being formally reported for excess to GSA are assumed by GSA. In addition, until the property is finally disposed of, it is to be carried on the real property inventory of FTB (COE, Savannah District, 1980).

Reportedly, a letter will be initiated and coordination effected with COE and GSA to obtain appropriate environmental compliance with regard to excessing actions.

FTB also has real property responsibility for 12 USAR centers located throughout the Commonwealth of Puerto Rico. A listing of the USAR centers and assigned units is included in App. B.

1.8 LEGAL CLAIMS

Installation records and interviews indicated no past or current legal claims or actions against or by FTB involving offsite contamination by exposure to or the handling/disposal of hazardous or toxic materials.

2.0 PAST AND CURRENT ACTIVITY REVIEW

2.1 INSTALLATION OPERATIONS

2.1.1 INDUSTRIAL OPERATIONS

Industrial operations involve maintenance and repair of passenger and utility wheeled vehicles, tracked utility vehicles, buildings, roads, and utilities. In addition, photographic and printed materials are produced onpost for training aids and information services.

Reportedly, past industrial activities on FTB were more extensive during and immediately following WWII. DIO and DEH vehicle maintenance shops in particular were larger than current shops.

Each industrial operation is described in this section under the shop or facility in which it is performed. There are seven vehicle maintenance shops and four vehicle wash racks. In addition, the installation has photographic, graphics, electrical, plumbing, air conditioning and refrigeration, carpentry and masonry, paint, metalworking and welding, preventive maintenance, and paving shops.

Vehicle Maintenance Shops

The seven vehicle maintenance shops at FTB are: DEH maintenance shop (Bldg. 556), Antilles Consolidated School System motor pool maintenance shop (Bldg. 566), Areawide Military Support Activity (AMSA) (Bldg. 653), 448th Engineer Battalion (Bldg. 653, 1322), USAR Center in Bayamon, P.R., Directorate of Personnel and Community Activities (DPCA) auto craft shop (Bldg. 563), and PX service station (Bldg. 380).

The DEH vehicle maintenance shop (Bldg. 556) performs organizational-level maintenance on passenger and utility vehicles, tracked utility vehicles, lawnmowers, edgers, and assorted small maintenance equipment.

Activities include oil servicing and minor tuneup work. More extensive repairs are performed by AMSA (Bldg. 653).

The Antilles Consolidated School System vehicle and equipment maintenance shop services school buses, utility vehicles, lawnmowers, and other small groundskeeping equipment.

The USAR Center in Bayamon performs organizational-level maintenance on wheeled passenger and utility vehicles and tracked utility vehicles.

The 448th Engineer Battalion (Bldg. 653) performs organizational-level maintenance on wheeled and tracked passenger and utility vehicles.

The DPCA auto craft shop (Bldg. 563) provides facilities for self-servicing of privately owned vehicles. Minor engine repair, tuneups, oil servicing, and brake work are performed.

The PX service station (Bldg. 380) services privately owned vehicles.

Vehicle Wash Racks

There are four vehicle wash racks on FTB and one at the USAR Center in Bayamon, as summarized in Table 2.1-1.

Media Support Activities

DPTSEC operates the TASC photographic shop at Bldg. 607. Color and black and white processing is performed. DPTSEC also operates a graphics shop at Bldg. 607. Informational posters are the principal product of this shop.

DPCA operated a small photographic shop at the arts and crafts center (Bldg. 564) until June 1982. The facility provided developing and darkroom equipment for occasional recreational use.

Table 2.1-1. Wash Rack Locations and Descriptions

Location/ Bldg. No.	Indoor/ Outdoor*	Treatment Measures†	Discharge
Bldg. 538, Near Arms Room	ID	GC, O/W	Sanitary sewer
AMSA (Bldg. 655)	ID	GC, O/W	Storm sewer
448th Engr Bn Bldg. 653	ID	None	Storm sewer
USAR Center Bayamon	ID	GC, O/W	Storm sewer
Army Ship Terminal Hapag Lloyd Co.	OD	None	Overland flow to storm sewer

* ID: Indoor, OD: Outdoor.
† GC: Grit collection, O/W: Oil/water separator.

Source: ESE, 1982.

Facilities Maintenance Shop

DEH operates the following shops on FTB for maintenance of real property. All shops are located in the DEH building (Bldg. 556).

The DEH electrical shop performs rewiring at the jobsite. The shop itself serves primarily for storage of materials and tools.

The DEH plumbing and sanitation shop services water and sewer piping.

The DEH refrigeration and air conditioning shop performs repairs and maintenance primarily at the jobsite, using the shop area for storage of tools and materials.

The DEH carpentry and masonry shop performs sawing, planing, and sanding of wood primarily in the shop. Masonry and bricklaying are performed primarily at the jobsite.

The DEH paint shop uses latex, enamel, lacquer, varnish, and stain in the shop and at the jobsite.

The DEH metalworking shop activities include cutting, forming, and welding of sheet metal and piping.

2.1.2 LESSEE INDUSTRIAL OPERATIONS

The Hapag-Lloyd Co., under sublease to PRPA, has operated a shipping office and material storage area at the Army Terminal since approximately 1975. Activities include storage and loading of sand, concrete blocks, fuel containers, grain, and bailed waste paper. The company also operates a facility for servicing heavy diesel-powered forklifts. Approximately 30 forklifts are maintained at the facility, which includes a 2,000-gallon (gal) diesel storage tank (aboveground) and a vehicle wash area (see Sec. 2.1.7, Table 2.1-4).

The Rexach Construction Co., under sublease to PRPA, has operated a ready-mix concrete plant at the Army Terminal since 1981. Activities include preparation of bulk concrete from cement, sand, and aggregate.

2.1.3 LABORATORY OPERATIONS

The principal laboratory operations at FTB are associated with clinical laboratories operated by the U.S. Army Medical Department Activity (MEDDAC) and the U.S. Army Dental Department Activity (DENTAC). A summary of laboratories and responsible activities is provided in Table 2.1-2.

The Health Clinic (Bldg. 518), which provides outpatient care to approximately 65 patients per day, has been in operation since 1966. The clinical chemistry laboratory, located in Bldg. 518, discharges dilute quantities of waste solvents and reagents to the sanitary sewer. Contaminated wastes from this activity are taken to the Veterinary Clinic (Bldg. 513) and frozen. This waste is subsequently taken each week to the Veterans Administration (VA) hospital in San Juan where it is incinerated. Radioisotopes have never been used at the Health Clinic.

A Veterinary Clinic is operated by MEDDAC in Bldg. 513. Dilute quantities of waste chemicals are discharged to the sanitary sewer. Infectious and contaminated wastes are frozen and taken weekly to the VA hospital in San Juan where they are incinerated.

Silver is recovered by the Medical Supply Branch from X-ray and photographic fixative solutions generated by the Health Clinic (Bldg. 518) and subsequently sent to the Defense Property Disposal Office (DPDO) at Roosevelt Roads Naval Station for resale. Fixative solution from which silver has been recovered is discharged to the sanitary sewer.

DENTAC also maintains clinics in Bldg. 518. Amalgams are stored under glycerin and turned over to the Medical Supply Branch for silver recovery on a quarterly basis. Records show 11.25 grams (g) of silver recovered from all DENTAC and MEDDAC activities in February 1982.

Table 2.1-2. Summary of Laboratory Operations at FTB

Laboratory	Activity	Bldg. No.
Clinical Laboratory (e.g., Hematology, Microbiology)	MEDDAC	518
Dental Clinic	DENTAC	518
X-Ray Clinic	MEDDAC	518
Veterinary Clinic	MEDDAC	513

Source: ESE, 1982.

In addition to the facilities operated by the medical and dental activities, several other industrial operations also recover silver from photographic processing. These operations are discussed in Sec. 2.2.1.

2.1.4 MATERIEL PROOF AND SURVEILLANCE TESTING

With one exception, no activities of this type reportedly occurred at FTB. A test firing facility located in Bldg. 556A operated until the 1960s. Small arms were test fired in this facility after being repaired in the small arms shop. No problems were reportedly associated with this activity, nor were any noted during the site visit.

2.1.5 RANGES AND TRAINING AREAS

The only training conducted at FTB consists of map reading exercises. Firefighting training is conducted at the nearby Gulf Oil Refinery. No weapons training is permitted at FTB. No training utilizing nuclear, biological, or chemical (NBC) agents or simulants is permitted at FTB, and no record of past activities of this type were found.

2.1.6 TOXIC/HAZARDOUS MATERIALS (HANDLING AND STORAGE)

Pesticides

Pesticides (insecticides, rodenticides, herbicides, and fungicides) are stored and/or used at FTB by the following directorates and activities:

1. DEH Entomology Section
2. DPCA Golf Course Activity

The following paragraphs briefly describe the storage and handling of pesticides by each of these directorates/activities.

DEH Entomology Section--Pesticides used by the DEH Entomology Section are currently stored in an open-sided shed located east of Bldg. 556 in the parking area and in the entomology office area of Bldg. 556. The primary DEH pesticide storage facility is the open-sided shed, which has been used as a storage area since 1977. The storage area is marked with the appropriate warning signs, fenced, and locked. The facility, however, is not enclosed and collects rain in the center. It was reported that this water is pumped out into the parking lot periodically. The structure allows pesticide formulations to get wet and does not comply with the criteria recommended by Federal regulations (EPA, 1982f) and USAEHA guidelines (USAEHA, 1975b).

For at least 10 years prior to 1977, pesticides were stored by DEH in the old arms building (Bldg. 539). This facility contained a separate caged-in area for the storage of pesticides. However, the floor was dirt, and the facility lacked continuous curbing or diking to control spillage as recommended by Federal regulations (EPA, 1982f).

The entomology office area in Bldg. 556 has also been used as a pesticide storage area. About 5 years ago, large quantities of pesticides were stored and mixed in this area. The area is marked with the appropriate warning signs. However, this room contains drains under the continuous curbing, causing spills to drain out into the parking area. No mixing currently occurs in this area, and only pesticide formulations which require no mixing (i.e., rat/cricket bait) are currently stored here. However, USAEHA (1975b) guidelines specifically prohibit storage of pesticides in the offices where personnel work for prolonged periods.

The types and quantities of pesticides currently stored by DEH are presented in Table 2.1-3. This listing also reflects the monthly usage of pesticides by DEH. In comparison, the usage of pesticides in 1956 by FTB (FTB, 1956) can be summarized as follows:

1.	2,4-D	227 kilograms (kg)/year
2.	2,4,5-T	136 kg/year
3.	Sodium trichloroacetate (TCA)	227 kg/year
4.	3-p-chlorophenyl-1,1-dimethyl-urea (CMU)	23 kg/year
5.	Chlordane	45 kg/year

Table 2.1-3. Pesticides Currently Stored and Used by DEH

	Pesticide	Amount*
1.	Baygon Bait (2%)	5 lb
2.	Chlordane 8E	10 gal
3.	Diazinon 4E	2 gal
4.	Ficam-W (76%)	36 pck
5.	Golden Malrin Fly Bait	10 lb
6.	Mole Cricket Bait	200 lb
7.	Malathion EC (57%)	2 gal
8.	Malathion (91%)	8 gal
9.	Naphthalene (moth balls)	10 boxes
10.	Pyrethrin-Vaporcide	30 gal
11.	Penta-40	2 gal
12.	Pivalyn	5 pck
13.	Prentex Vapon EC (20%)	1 gal
14.	Sevin (10%)	15 lb
15.	Sevin (80%)	6 lb
16.	Snail and Slug Pellets	10 pck
17.	Surfaitant	30 oz
18.	Tossits, Pyrethrum Larvicide Caps	15 cans
19.	Warfarin	20 lb
20.	Glue, Rat	2 gal
21.	Pellet Rat Bait	10 lb
22.	Para-Blox	120 bars
23.	Tracking Powder	5 lb
24.	Trap, Mouse, Snap	2 dz
25.	Trap, Rat, Snap	6 dz
26.	Hyvar-X	16 lb
27.	Pramitol 5 PS	50 lb
28.	Pramitol 25E	20 gal

* lb = pounds.
pck = packages.
oz = ounces.
dz = dozen.

Source: ESE, 1982.

Mixing and formulation of pesticide solutions are performed in the parking lot outside of the open-sided shed. No water source is available in this area. There are no facilities to contain spills and facilitate decontamination, as recommended by USAEHA guidelines (USAEHA, 1975b). Empty containers are triple-rinsed, crushed, punctured, and subsequently disposed of in dumpsters. Rinse water is reused as a diluent.

Reportedly, funding has been approved for the construction of new pest control facilities which will comply with all Federal regulations. Bids will be solicited in the near future.

The DEH Entomology Section took over the storage/usage of pesticides from the Building and Grounds Section in 1982. Two certified pesticide operators currently work for DEH. No records of pesticide usage had been completed prior to 1982. The DD 1532 usage form has never been submitted by FTB. DEH has kept a pesticide usage log summarizing daily pesticide usage since January 1982, but has not yet submitted the DD 1532 usage form.

In 1968, a truckload of miscellaneous pesticides was reportedly received from Fort Brooke and stored in the old arms building (Bldg. 539). At this time, Bldg. 539 was used as the chemical storage area for FTB and contained acids, bases, solvents, and pesticides. In 1977, the pesticides received from Fort Brooke were removed from Bldg. 539. DDT (approximately 600 gal) was separated and moved to Bldg. 596, which was the DPDO yard at that time. The other pesticides were buried in a trench near the perimeter fence bordering P.R. 28 and just north of the helipad. The exact nature of what was buried is not known, but was described as consisting of approximately ten to twenty 5-gal metal containers of dry pesticides and pesticides in bags and boxes of various sizes. This burial is discussed further in Sec. 2.2.3. The DDT remained in Bldg. 596 until June 1981 when it was taken to DPDO at

Roosevelt Roads Naval Station for subsequent disposal by Chemical Waste Management, in Emelle, Ala.

It was reported that DDT was applied in excess next to the Puerto Rico Cement Corp. Lake in 1970. Fish samples from the lake were subsequently analyzed for DDT levels by the Food and Drug Administration (FDA). No data are available from these samples. Levels were reportedly high at first, but the last analyses, in 1980, reportedly showed undetectable concentrations. Currently, no DDT is being stored or used on FTB.

<u>DPCA Golf Course Activity</u>--Pesticides are currently stored in the golf cart maintenance area (Bldg. 138) and are used by DPCA in maintaining trees and greens on the golf course. The following types and quantities of pesticides were stored at the time of site visit:

Cricket Bait	2 bags
Rad-E-Cate 25	5 gal
Dal-E-Rad 120	50 gal
Dursban	15 liters (1)

The above inventory reflects the quarterly usage by the golf course.

The pesticide storage area within Bldg. 138 is part of the golf cart maintenance area. Pesticide warning signs are not posted outside this facility, and the building is not locked. The building is dry, well ventilated, and fire resistant, but lacks continuous curbing to control spillage; therefore, the facility does not comply with the criteria recommended by Federal regulations (EPA, 1982f) and USAEHA (1975a) guidelines.

Mixing and formulating of pesticides are conducted behind Bldg. 138. Shower and eyewash facilities are available in this area. However, there are no facilities to contain spills and facilitate decontamination, contrary to USAEHA (1975a) guidelines. Empty pesticide containers are triple-rinsed and disposed of in dumpsters. Rinse water is reused in subsequent formulations or disposed of at or near the site of application.

The golf course had one certified pesticide operator at the time of the site visit. The pesticide usage form (DD 1532) had been submitted to DEH by DPCA, but had never been forwarded any further.

Polychlorinated Biphenyls (PCBs)

PCB-containing transformers and capacitors have been used and are currently in use at FTB. There are approximately 180 in-service transformers at FTB. A survey of in-service transformers is currently being conducted by DEH to determine proper marking requirements. Approximately two-thirds of the transformers have been surveyed to date. Reportedly, all remaining transformers are in use, in good condition, and will be sampled as manhours become available. It was reported that samples of in-service transformer fluid are taken at a rate of three to six per month and are sent to the USAEHA laboratory for analysis. Federal regulations require that PCB transformers [500 parts per million (ppm) or greater PCB concentration] and large (1.4 kg or more of dielectric fluid), high voltage (2,000 volts or above) PCB capacitors be properly marked (EPA, 1982e).

Out-of-service transformers are currently stored in two locations at FTB, on the west side of Bldg. 556 on a concrete slab and inside the warehouse area in Bldg. 556. At the time of the site visit, approximately 50 transformers were stored on the west side of Bldg. 556 on a concrete slab. All transformers had been analyzed for PCB content and found to be <50 ppm. All transformers identified as PCB or PCB-contaminated are currently stored in the warehouse area of Bldg. 556. This area is kept locked and has the appropriate warning signs posted. [Since the site visit, a concrete base and retaining wall for the storage of PCB transformers and containment of possible spills have been in use.] At the time of the site visit, three PCB-contaminated transformers had been stored in this area for 6 to 8 months. DPDO at Roosevelt Roads Naval Station maintains paperwork accountability, but DEH retains physical custody until the transformers are disposed of. It was reported that the bid for the disposal contract would go out in September 1982. The last hazardous waste contract was with Chemical Waste Management in Emelle, Ala.

A special hazardous waste storage facility is projected for construction in FY83. This facility will contain an approved PCB storage area which will meet Federal regulations (EPA, 1979).

It was reported that on June 9, 1982, a spill occurred in Bldg. 556 in the supply area. Approximately 2 gal of transformer fluid spilled on the concrete floor. The liquid was cleaned up and put into steel drums and four samples collected for PCB analysis. Laboratory analysis by MacMillan Research, LTD, in Marietta, Ga., indicated that all four samples contained <50 ppm.

Chemical/Biological (CB) Agents

No record was found of the manufacture, storage, or use of lethal CB agents or munitions at FTB. CS tear gas has never been used at FTB.

Radiological Materials

Activities at the Health Clinic do not require a U.S. Nuclear Regulatory Commission (NRC) license. Radioisotopes have never been used at the Health Clinic. One X-ray unit at the Health Clinic is used by both MEDDAC and DENTAC and is certified by NRC and USAEHA.

Radioactive material held by FTB includes Radiac survey meters used by the USAR units and a soil moisture and density meter located at the 448th Engineering Battalion in Bldg. 1322. Storage and use of the soil moisture and density meter are under an NRC license (No. 21-01222-05) held by the U.S. Army Tank-Automotive Command (TACOM) in Warren, Mich. The meter has not been used for over a year due to a malfunction. FTB is awaiting instruction from Lexington-Blue Grass Army Depot Activity, Ky., so that the meter can be returned for repair.

2.1.7 POL HANDLING AND STORAGE

The types of POL used and stored on FTB include motor gas, diesel fuel, heating fuel oil, petroleum-based solvents, hydraulic fluid, and lubricating oil. Solvents, hydraulic fluid, and lubricating oil are stored aboveground in 55-gal drums and smaller containers. Motor gas and diesel fuel are stored in underground tanks. Heating fuel oil is stored in both aboveground and underground tanks. The locations and capacities of POL storage tanks are listed in Table 2.1-4.

Waste POL generated at FTB includes lubricating oil, solvents, hydraulic fluid, and small amounts of motor gas, diesel fuel, and heating fuel oil.

Although no major POL spills were reported at FTB, minor spills of motor gas, diesel fuel, and heating fuel oil regularly occur during POL transfer. In addition, waste solvents are routinely disposed of in storm sewer drains at some shops, as discussed in Sec. 2.2.1. Spill management is addressed in the Installation Spill Contingency Plan (ISCP) and the Spill Prevention Control and Countermeasure (SPCC) Plan. Both plans were revised in April 1982. As currently written, the plans lack a list of POL storage locations. An updated list of POL storage locations will be added as part of the current revisions.

Underground Storage

Underground storage tanks for motor gas, diesel fuel, and heating fuel oil range in size from 5,000 to 10,000 gal and are associated with fuel transfer. Out-of-service underground tanks at Bldgs. 138 and 152 were associated with laundry boiler fuel storage and fuel transfer. The tank at Bldg. 138 has been empty since approximately 1965.

The revised facility SPCC Plan does not specify routine testing for leakage from underground storage tanks. Nevertheless, POL point operators ordinarily monitor potential leakage through pumping records. Since there are no locations at FTB with aggregate underground POL

Table 2.1-4. Aboveground and Underground POL Storage Tanks

Location/ Bldg. No.	Types of POL*	Types of Storage†	Total Aggregate Capacity (gal)
DEH Bldg. 556	MOGAS	U	5,000
AMSA	MOGAS	U	5,000
Bldg. 654††	D	U	5,000
PX Service Station	MOGAS	U	30,000
Bldg. 380	WO	A	500
Old DIO Laundry** Bldg. 138	HF	U	Unknown
Bldg. 152	MOGAS	U	20,000
USAR Bayamon	MOGAS	U	5,000
	**		Unknown
Ship Terminal, Hapag-Lloyd Co.	D	A	2,000

* MOGAS: Motor gas.
D: Diesel fuel.
HF: Heating fuel oil.
WO: Waste oil.
† U: Underground.
A: Aboveground.
** Out of service, tanks empty.
†† Temporarily out of service for testing and repair/replacement from June 1982.

Source: ESE, 1982.

storage greater than 42,000 gal, pressure testing as recommended by Federal regulations (EPA, 1982d) is not required.

During the second quarter of 1982, unexplained losses of motor gas and diesel fuel at the AMSA POL point (Bldg. 654) were detected by the POL point operator through stick gauging and pumping records. During the same time, water was detected in fuel stored in the tank. It is suspected that percolating storm water is infiltrating the tanks, while fuel contaminated with water is leaking from the tanks. The tanks, which are made of steel, were installed in the 1940s. The infiltration/leakage intensifies the inherent difficulty of estimating losses. However, it is estimated that total losses are less than 1,000 gal. As a direct result of these losses, FTB personnel drained the tanks and placed them out of service in June 1982. Subsequent to the site visit, tank testing specialists from the neighboring Texaco refinery were retained to test tank integrity. Reportedly, one of the two tanks in question was found leaking and was repaired.

Aboveground Storage

A 2,000-gal aboveground diesel fuel storage tank is located at the Army Terminal. The tank, owned by the Hapag-Lloyd Co. (a lessee industrial activity described in Sec. 2.1.2), is used to store and transfer fuel for forklifts. Reportedly, the tank has been onsite for approximately 5 months. At the time of the site visit, the tank was not equipped with facilities for containing spillage in accordance with Army regulations (U.S. Army, 1978). Subsequent to the site visit, containment has been provided. Minor POL spillage is evident throughout the Hapag-Lloyd area. The area is is drained by a central storm drain directly to the adjacent harbor.

Drum Storage of Incoming POL

Incoming POL other than the types previously discussed include petroleum-based solvents, hydraulic fluid, and lubricating oil. These types of POL are stored at individual user activities in 1-, 5-, and 55-gal containers. Because activities are limited, only small quantities are stored. In most locations, quantities are less than

100 gal (i.e., one or two 55-gal drums). The largest single incoming POL storage area is located in the parking area of the AMSA facility (Bldg. 653), where approximately 825 gal (fifteen 55-gal drums) of lubricating oil and hydraulic fluid are stored. At this location, incoming and waste POL are stored together and thus constitute one aggregate volume for regulatory purposes. Five of the incoming POL drums are stored on a concrete pad located in a fenced enclosure, and the other 10 are stored on an adjacent metal rack. At the time of the site visit, the pad was curbed, but had a horizontal drain pipe which allowed minor spillage onto the surrounding ground. The metal rack was not curbed. There was evidence of spillage on and around the pad within the fenced enclosure and around the rack at the time of the onsite survey. Subsequent to the site visit, reportedly the drain pipe was closed, and the metal rack was curbed. Runoff from the area and the adjacent waste POL drum storage area drains overland to a storm drain which empties into an offpost drainage ditch approximately 90 m away. The ditch was not accessible and could not be observed for evidence of contamination. There are no monitoring data on the ditch, and there have been no complaints of contamination due to AMSA discharge. However, combined storage of incoming POL and waste POL exceeds 1,000 gal and, thus, requires facilities for containing spillage, in accordance with Army regulations (U.S. Army, 1978).

Waste POL Storage

Waste POL on FTB includes waste lubricating oil, petroleum-based solvents, hydraulic fluid, and small amounts of contaminated motor gas and diesel fuel. The generation and characteristics of waste POL are discussed in Sec. 2.2.1.

Waste POL is stored at its generation points in drums and aboveground mobile tanks until storage capacity is reached. Then, waste POL is either removed by contractors for recovery, reuse, or disposal offpost or is taken to DPDO at Roosevelt Roads Naval Station. As discussed in Sec. 2.2.1, waste oil and petroleum-based solvents are drummed separately at some shops and combined at others.

At the AMSA facility (Bldg. 653), waste oil, waste solvents, and incoming POL are stored in 55-gal drums. Incoming POL is stored inside a fenced enclosure as described previously in this section. Waste POL drums are stored both inside and immediately outside the enclosure. At the time of the site visit, waste POL drums were stored directly on the ground without facilities for containing spillage. Approximately 825 gal (i.e., 15 drums) of waste POL were stored at the time of the site survey. This quantity combined with the 825 gal of incoming POL exceeds 1,000 gal. Since the site visit, facilities for containing spills have been provided, as required by Army and Federal regulations (U.S. Army, 1978; EPA, 1982d).

2.2 DISPOSAL OPERATIONS

2.2.1 INDUSTRIAL WASTES

Industrial wastes generated on FTB include waste POL, wash rack wastewater, spent photographic solutions, waste paint and thinner, and metal scrap. Specific industrial wastes and disposal practices are discussed in the following paragraphs by types of industrial activities.

Vehicle and Equipment Maintenance Shops

Vehicle and equipment maintenance generates waste POL (lubricating oil, contaminated fuel, hydraulic fluid, and petroleum-based solvents), wastewater and solids from wash racks, spent automotive battery electrolyte, and metal scrap.

Table 2.2-1 summarizes approximate annual generation rates for waste POL on FTB.

Total estimated waste oil generation is 11,048 liters per year (lpy). Waste hydraulic fluid generation is approximately 538 lpy. Waste degreasing solvent generation is approximately 1,003 lpy. Waste oil is stored primarily in drums at the generation points.

Table 2.2-1. Quantities of Waste POL Generated (lpy)

Location/ Bldg. No.	Waste Oil	Solvents	Hydraulic Fluid	Other Waste POL Mixed with Waste Oil*
DEH Maintenance (Bldg. 556)	2,498	--	--	--
Antilles School System Vehicle Maintenance (Bldg. 566)	1,305	378	95	473
AMSA (Bldgs. 653, 654)	3,009	303	208	511
448th Engr Bn (Bldgs. 653, 1322)	†	†	†	†
USAR Center Bayamon	2,820	227	95	322
DPCA Auto Craft Shop (Bldg. 563)	242	--	45	45
PX Service Station (Bldg. 380)	1,174	95	95	190
TOTAL	11,048	1,003	538	1,541

* Total quantity of all other solvents mixed with waste oil. This quantity is included in waste oil column.
† Waste POL from the 448th Engineers Battalion is included in the quantity of waste oil from AMSA, because waste oil from both activities is stored in the same location.

Source: ESE, 1982.

Waste hydraulic fluid is generally mixed with waste oil in waste oil drums or tanks. Waste solvents from vehicle maintenance degreasing are predominantly mineral spirits, varsol, and kerosene.

Waste solvents are either mixed with waste oil in drums and tanks or drummed separately and stored temporarily at the generation point. Waste POL segregation by type has reportedly been practiced since approximately 1980. Waste POL is either removed by contractors for recovery, reuse, or disposal offpost or is taken to DPDO at Roosevelt Roads Naval Station. Prior to 1980, waste solvents were generally mixed with waste oil, which was reportedly contractor hauled offpost or taken to DPDO since the early 1960s. No information is available for waste oil disposition prior to 1960.

One exception to past waste oil collection is the DPCA auto craft shop (Bldg. 564), where waste oil was routinely poured either onto the ground or into a storm sewer inlet from approximately 1970 to 1980. During 1980 and 1981, waste oil from the shop was taken to DPDO. Since early 1982, however, waste oil has been hauled offpost by a contractor for grass burning.

As described in Sec. 2.1.7, waste POL at the AMSA facility (Bldg. 653) is collected in labeled drums and segregated as used oil and used solvent. These drums and some incoming POL drums are stored in and around a fenced enclosure. All waste POL from AMSA is taken to DPDO for salvage and/or disposal. The area stores an aggregate volume greater than 1,000 gal and lacks facilities for containing spillage, contrary to Army and Federal regulations (U.S. Army, 1978; EPA, 1982d).

At the DEH maintenance shop (Bldg. 556), mixed waste oil and solvents are stored in open 55-gal drums (i.e., without lids) under an open shed. This practice does not minimize the possibility of an accidental spill and potential pollution, as stipulated by Army regulations (U.S. Army, 1978).

The AMSA facility (Bldg. 653) operates a battery rework shop in a closed metal shed adjacent to the main building. Approximately 60 to 75 automotive batteries are processed each month. Spent electrolyte is diluted with water in a 15-gal tank until neutralized, as determined with pH paper. The mixture is then discharged directly to the asphalt motor pool area adjacent to the shed. The quantity of diluted electrolyte is small and reportedly evaporates on the asphalt surface before migration can occur. Nevertheless, this practice does not minimize the possiblity of pollution to land and water, as stipulated by Army regulations (U.S. Army, 1978). Potential pollution could be minimized by discharging diluted electrolyte to the sanitary sewer at either a manhole or a sanitary drain in Bldg. 653.

Vehicle washing is performed at four wash areas on FTB, as summarized in Table 2.1-1. Water and detergent are used for washing at all wash areas. A vehicle wash rack using steam cleaning with detergent is also located at the USAR center in Bayamon. At Bldgs. 538 and 655 and at the USAR center in Bayamon, wash racks are equipped with grit collection boxes and oil/water separators.

Materials collected from grit boxes (clay, sand, rocks, metal, oil, and grease) are disposed of in dumpsters. Oil from oil/water separators is reportedly disposed of with waste oil. Oil/water separators are required by Army regulations (U.S. Army, 1978). Wash areas at Bldg. 653 and the Hapag-Lloyd Co. area at the Army Terminal are not equipped with wastewater controls. Wash areas at Bldgs. 655 and 653, the USAR Center in Bayamon, and the Hapag-Lloyd Co. area discharge wash rack wastewater to storm sewers without a National Pollutant Discharge Elimination System (NPDES) permit, as required by Federal regulations (EPA, 1982a). Reportedly, funds have been requested to construct an oil trap on these wash racks in order to connect the wash rack discharges to the sanitary sewer.

Media Support Activity Wastes

The DPTSEC/TASC photographic section (Bldg. 607) generates approximately 20 l per month of spent photographic solutions which are sent to DPDO at Roosevelt Roads Naval Station for silver recovery. An additional 40 l per month of spent photographic solutions are disposed of in the sanitary sewer at the shop without silver recovery. A silver recovery unit for use in the shop has been ordered. [Subsequent to the site visit, it was reported that the recovery unit had been installed and was operational.] When the unit is installed, all spent photographic solutions will be processed through the unit, and recovered silver will be taken to DPDO. Approximately 22 kg per month of discarded film are taken to DPDO for salvage.

The DPTSEC/TASC graphics shop (Bldg. 607) generates small quantities of rollerwash (1 liter per week) and ammonia solution (4 l per month) which are discharged to the sanitary sewer. Approximately less than 0.5 l per week of lacquer enamel and thinners are disposed of in cans in the dumpster. Dumpster wastes are contract hauled offsite for disposal.

The DPCA photographic craft shop (Bldg. 564) intermittently discharged spent photographic solutions without silver recovery to the sanitary sewer in small quantities until it closed in June 1982. Although the exact quantities discharged are not known, no problems have been associated with this discharge.

Facilities Maintenance Shop Wastes

The DEH electrical shop (Bldg. 556) generates essentially no liquid waste. Only small quantities of spray contact cleaner are used. Empty spray cans are discarded in the dumpster. Dumpster wastes are contract hauled offpost for disposal.

The DEH air conditioning shop and the plumbing and sanitation shop (Bldg. 556) generate small but unquantified amounts of acidic coil cleaner from servicing refrigeration units. Coil cleaner (sulfonic acid) is washed off on the ground at jobsites. In addition, unspecified quantities of caustic cleaning compound used to clean drains are discharged to septic tanks and sanitary sewers. At the shop, unspecified quantities of various cleaning compounds and solvents (i.e., mineral spirits and varsol) used in the shop are intermittently discarded down the storm sewer inlets at the DEH compound (Bldg. 556). Although this practice is environmentally unsound, the waste quantities involved are small.

The DEH carpentry and masonry shop generates waste sawdust which is drummed and stored by the DEH environmental section for use in spill control. Shop masonry activities generate small quantities of acidic brick wash which is washed off onto the ground at jobsites.

The DEH paint shop (Bldg. 556) generates small quantities of waste paint which is disposed of in cans placed in the dumpster and subsequently contract hauled offpost for disposal. The shop also generates small quantities of waste enamel thinner and lacquer thinner which are intermittently poured down the storm sewer inlets at the DEH compound (Bldg. 556).

The DEH metalworking and welding shop (Bldg. 556) generates essentially no liquid waste. Rags contaminated with hydrochloric acid are placed in the dumpster and subsequently contract hauled offpost for disposal.

2.2.2 WASTEWATER TREATMENT

FTB is served by separate sanitary and storm sewer systems. Storm drains discharge untreated storm water to the Malaria Control Canal and El Toro Creek. Sanitary and industrial wastewater are discharged to the Puerto Rico Aqueduct and Sewage Authority (PRASA) sanitary sewer system and are treated at a PRASA sewage treatment plant (STP) in Bayamon.

Although FTB's sanitary and industrial sewage flow has not been directly monitored, it is estimated by DEH personnel to be 944 cubic meters (m^3) per day, or approximately 66 percent of the installation's potable water usage. This estimate appears valid, based on wastewater flow estimates at other installations.

Wastewater quality monitoring data on FTB sewage flow are not available. However, no problems are reported at the PRASA STP as a result of FTB sewage flow.

The Commonwealth of Puerto Rico has a cooperative agreement with EPA for the Commonwealth to perform NPDES inspections and review monitoring data while EPA issues permits. FTB has never applied for or received an NPDES permit and does not currently plan to do so. However, the installation has four vehicle wash racks which discharge to storm drainage, as described in Table 2.1-1, without an NPDES permit, as required by Federal regulations (EPA, 1982a).

2.2.3 SOLID WASTE DISPOSAL

Sanitary Landfill

All solid waste generated at FTB is contract hauled to the city of San Juan landfill, with the exception of construction debris and tree trimmings which are disposed of in an onsite landfill (see Fig. 2.2-1). No past landfill activity was identified at FTB, although the installation operated a solid waste incinerator from 1940 to 1946. Ash from the incinerator was reportedly spread on the ground near the incinerator. The current landfill does not have an EQB permit; however, EQB is aware of the operation and has given informal approval. The landfill reportedly contains no toxic or hazardous material. The standing operating procedure (SOP) for the landfill was not being adhered to at the time of the site visit; specifically, the landfill gate was unlocked and open during the entire week of the site visit. This is of concern for the usual reasons of unauthorized dumping, but also due the proximity of the elementary school.

Pesticide Burial

Approximately 1 ton of surplus pesticides was brought to FTB in 1968 for storage. These pesticides were transferred from Fort Brooke when it was excessed to the National Park Service. Fort Brooke was located in the old Spanish fortification known as El Morro in Old San Juan. In 1977,

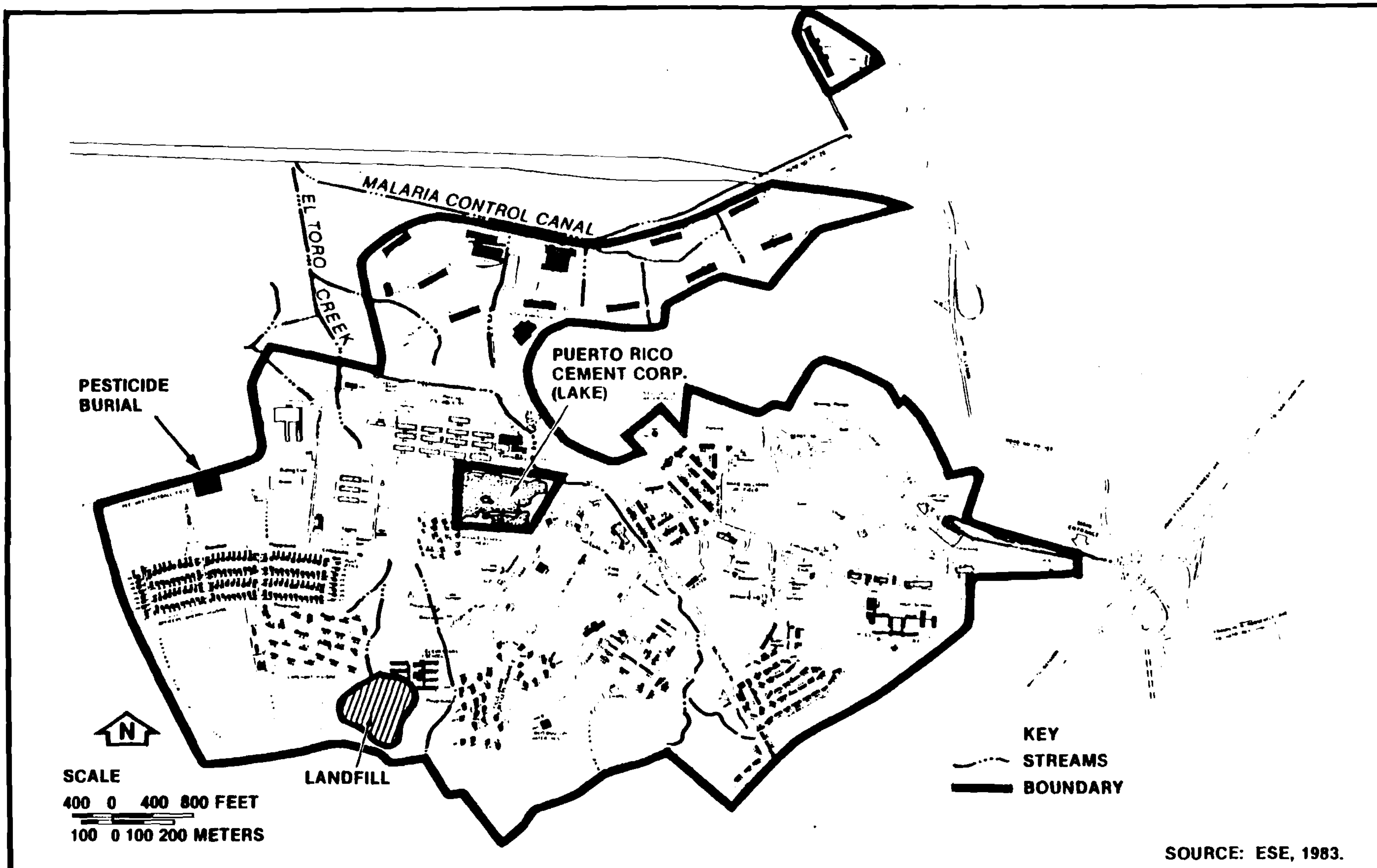


Figure 2.2-1
LANDFILL LOCATION MAP —— FORT BUCHANAN

Prepared for:
U.S. Army Toxic and Hazardous Materials Agency
Aberdeen Proving Ground, Maryland

the building in which the pesticides were stored (Bldg. 539) was cleaned out to facilitate extensive renovations, and the pesticides reportedly were buried in a shallow trench in the northwest part of the installation about 5 to 10 m from the installation boundary (Fig. 2.2-2).

The trench was originally dug with a bulldozer to bury some trees which had been cut down in the area. The pesticides were deposited into the trench from a dump truck. The 2-m deep by 6-m wide by 15- to 30-m long trench was then filled with the trees and the original soil, and the area was compacted by the bulldozer. During the site visit, tree trunks were observed to be protruding slightly from the soil.

Employee interviews indicated that the material buried consisted of about one truckload of dry pesticides, mostly in bags and boxes, but also between ten and twenty 5-gal metal containers. No records of the exact identification of these pesticides could be located. Records indicate that in the late 1950s, the following pesticides were in use at FTB: chlordane, 2,4-D, 2,4,5-T, TCA, and CMU. Since FTB supported Fort Brooke, the same pesticides might have been in use at Fort Brooke in 1968.

In 1980, PRASA emplaced a potable water supply main across FTB connecting the San Juan and Bayamon water supply systems. This line consists of a 66-inch (in) diameter reinforced-concrete pipe laid in a trench about 3 m deep. The pipe is made up of 8-foot (ft) long joints sealed with neoprene gaskets. Available information indicated that the PRASA pipe trench passed close to the pesticide burial and may have intersected it. This pipe carries finished water to the public distribution system. Fig. 2.2-3 is a schematic cross section of the pesticide burial area and indicates the geometric relationships, which were unknown at the time of the site visit. A limited contamination assessment was undertaken to provide additional informaton on the pesticide burial site. This assessment is discussed in Sec. 3.1.15.

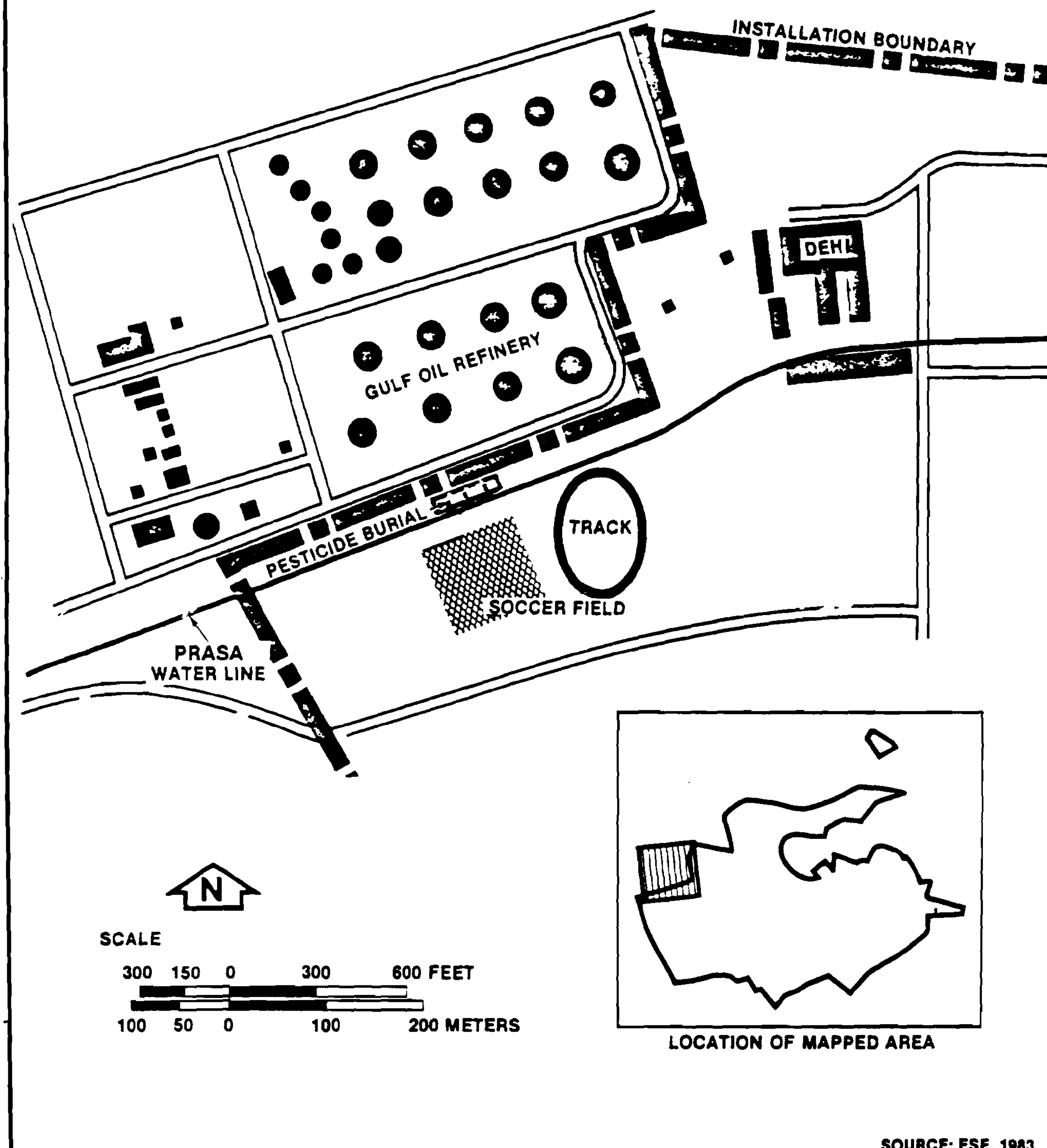
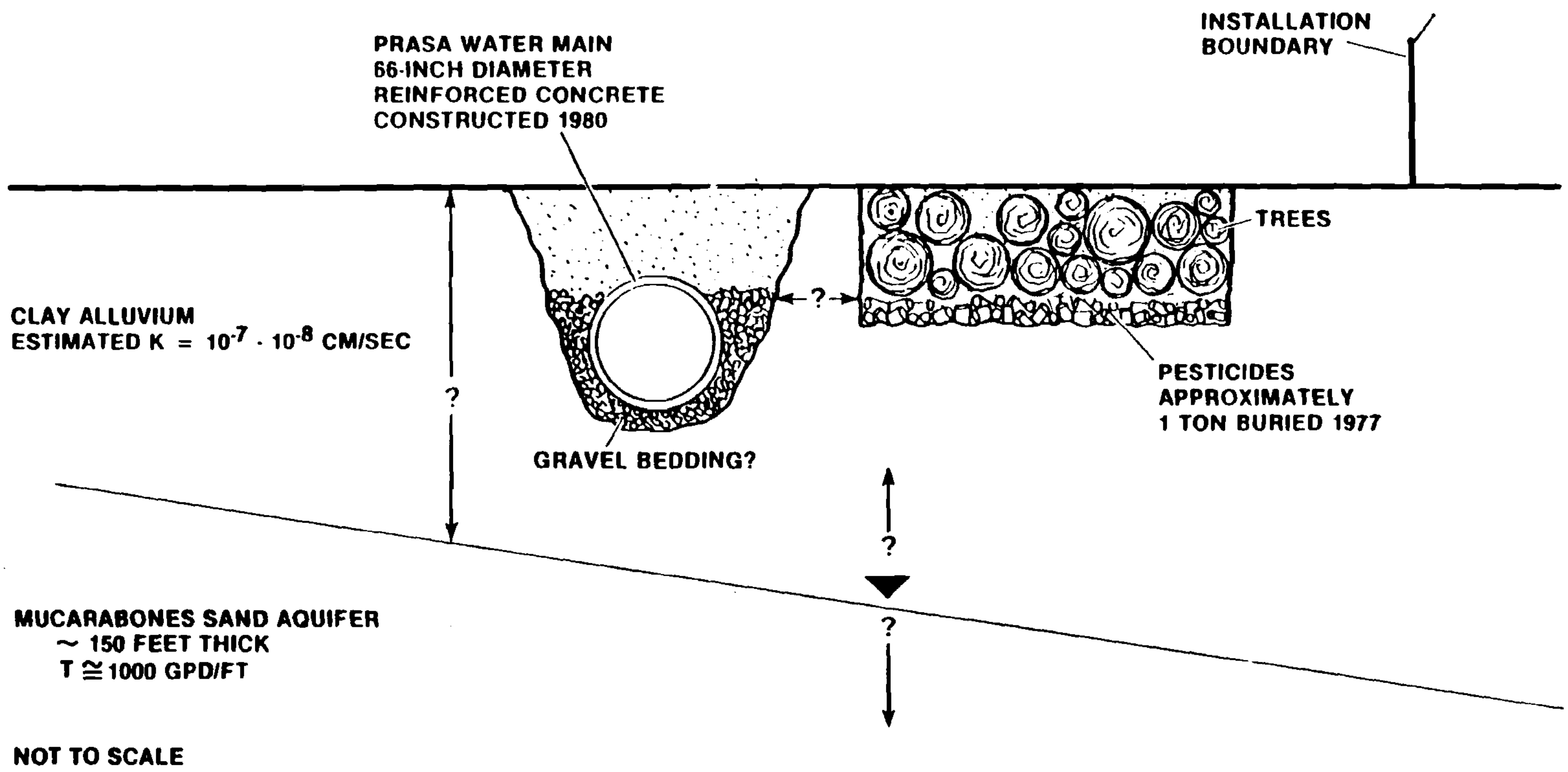


Figure 2.2-2
LOCATION OF PESTICIDE BURIAL SITE

Prepared for:
U.S. Army Toxic and Hazardous Materials Agency
Aberdeen Proving Ground, Maryland



SOURCE: ESE, 1983.

Figure 2.2-3
SCHEMATIC CROSS SECTION OF PESTICIDE BURIAL AREA ––
FORT BUCHANAN

Prepared for:
U.S. Army Toxic and Hazardous Materials Agency
Aberdeen Proving Ground, Maryland

2.2.4 DEMOLITION AND BURNING GROUNDS

There are no authorized demolition or buring ground areas on FTB, and no explosive ordnance disposal (EOD) activities have occurred onsite.

2.2.5 DEMILITARIZATION

No significant current or past demilitarization activities have occurred onsite.

2.2.6 RESOURCE CONSERVATION AND RECOVERY ACT (RCRA) STATUS

FTB filed a RCRA notification form and Part A RCRA permit application as a hazardous waste storage facility in November 1982. Approximately 2,460 l of waste DDT and other pesticides stored on FTB in Bldg. 539 were the only wastes listed on the RCRA permit. The pesticides originated at Fort Brooke and were transferred to FTB when Fort Brooke was closed in 1968. The DDT was taken to DPDO at Roosevelt Roads Naval Station in June 1981 and were subsequently shipped to DPDO at Fort Gillem, and the other pesticides were buried. Based on reported waste generation rates, FTB is evidently a small quantity generator of potentially hazardous wastes and is not required to comply with RCRA regulations as long as small quantity hazardous wastes are disposed of in licensed disposal facilities.

The Commonwealth of Puerto Rico obtained Phase I RCRA Interim Authorization in October 1982. A RCRA interim status inspection was conducted in June 1982 at FTB. A report of findings is not yet available.

2.3 <u>WATER QUALITY</u>

2.3.1 SURFACE

The surface waters at FTB are classified by the Commonwealth of Puerto Rico as Class SD waters and are subject to the corresponding water quality criteria which are presented in App. C. Class SD surface waters are those intended for use as a raw water source for public water supply and in propagation and preservation of desirable species.

Two bodies of water exist within the boundaries of FTB, the Puerto Rico Cement Corp. Lake and El Toro Creek. The Puerto Rico Cement Corp. Lake is a spring-fed, 0.8-ha, privately owned pond which was once used for process water by the Puerto Rico Cement Corp. The pond now serves as a freshwater aquatic and marshland bird refuge. It was reported that routine water quality analyses [i.e., biochemical oxygen demand (BOD) and dissolved oxygen (DO)] had previously been conducted at the lake, but no record could be found. Results of this study reportedly showed no problems with the water quality at the Puerto Rico Cement Corp. Lake. Eutrophication at the lake is controlled by mechanical harvesting of excess floating vegetation (U.S. Army Garrison, FTB, Environmental/ Energy Office, 1980). No trace metal or pesticide water quality data have been collected.

El Toro Creek is a small stream originating just south of FTB and flowing north to the Malaria Control Canal. Although the only discharge to the creek from FTB is sediment runoff, the creek experiences odor problems due to illegal connection of septic tanks to the storm sewer located in Tintillo, south of the installation. During the dry season, raw sewage comprises 100 percent of the creek's flow (U.S. Army Garrison, FTB, Environmental/Energy Office, 1980). In 1981, EQB conducted a water quality study (Division Reclamaciones Negociado Planificacion, Calidad de Aqua, 1981) to identify the sources of contamination to the Malaria Control Canal. Fourteen sites were sampled on the Malaria Control Canal, Diego Creek, Lajas Creek, and El Toro Creek. The two sites sampled on El Toro Creek are shown on Fig. 2.3-1 and described as follows:

<u>Station 1</u>: El Toro Creek, at Eighth St. (just south of FTB boundary).

<u>Station 2</u>: El Toro Creek, 7.6 m before the intersection of El Toro Creek with the Malaria Control Canal (400 m downstream of FTB).

Chemical analyses for these sites included routine water quality parameters. No pesticide or trace metal data were collected. Data from these two sites, presented in Table 2.3-1, show that concentrations of total coliform, fecal coliform, color, and total phosphorus at both

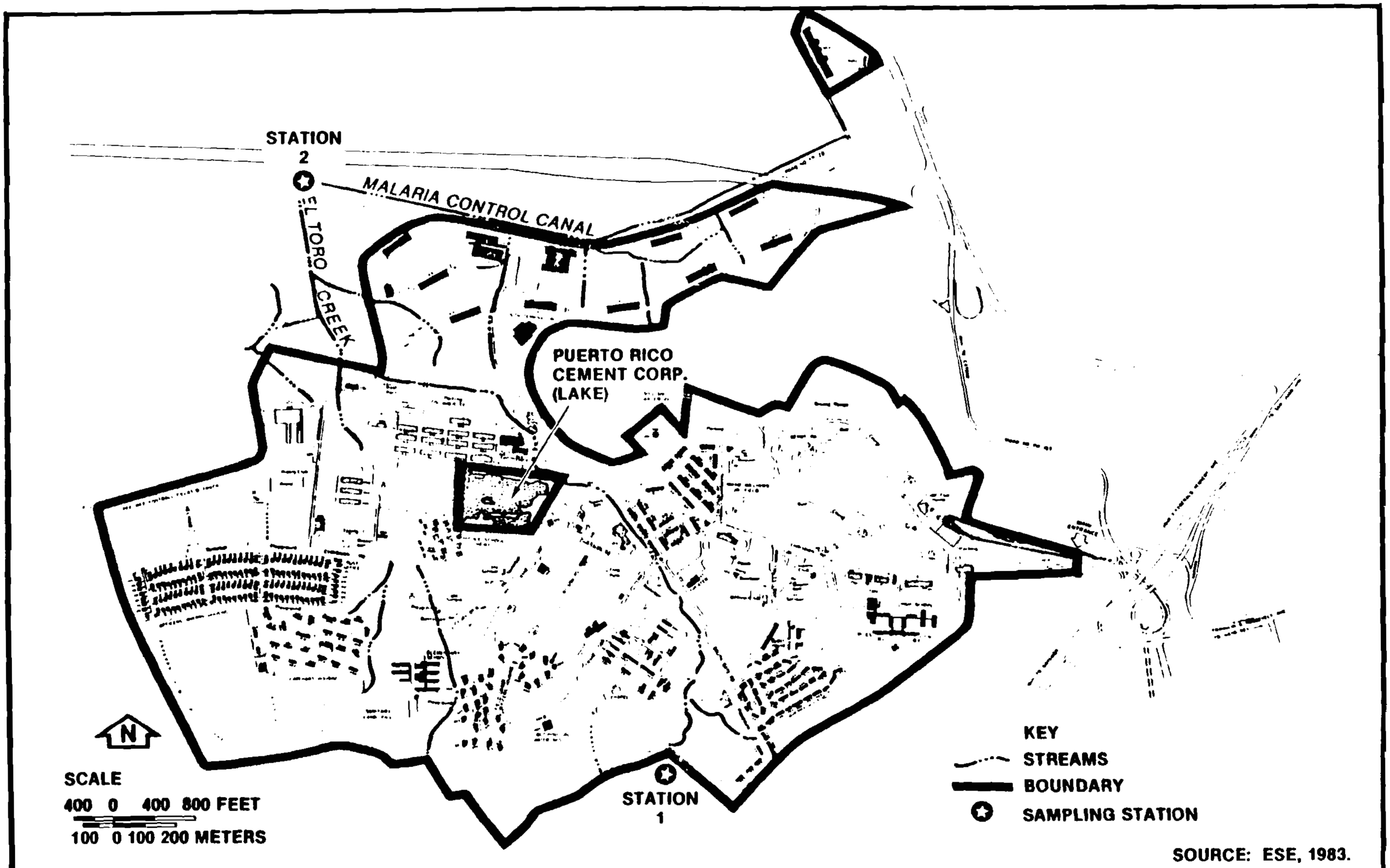


Figure 2.3-1
WATER QUALITY SAMPLING STATIONS —— FORT BUCHANAN

Prepared for:
U.S. Army Toxic and Hazardous Materials Agency
Aberdeen Proving Ground, Maryland

Table 2.3-1. Water Quality Results, El Toro Creek

Parameter	Station 1	Station 2	Puerto Rico Class SD Standard
Total Coliform (#/100 ml)	16,000*	16,000*	10,000
Fecal Coliform (#/100 ml)	12,000*	13,000*	2,000
Oil and Grease (mg/l)	<5	<5	
Total Dissolved Solids (mg/l)	292	303	500
Total Suspended Solids (mg/l)	18	22	
Settleable Solids (mg/l)	0	0	
Turbidity (JTU)	9.4	5.7	50
Chloride (mg/l)	60.4	45.3	250
Total Phosphorus (mg/l)	0.660*	0.230*	0.025
Color (pcu)	25*	25*	10
NO_3 + NO_2 (mg/l)	2.96	1.54	10
TKN (mg/l)	4.92	0.771	--
BOD (mg/l)	8.5	<1.9	--
COD (mg/l)	25.4	4.04	--

* Exceeds Puerto Rico Class SD water quality standard.

Abbreviations:
ml = milliliters.
mg/l = milligrams per liter.
JTU = Jackson turbidity units.
pcu = platinum cobalt units.
NO_3 = nitrate.
NO_2 = nitrogen dioxide.
TKN = total Kjeldahl nitrogen.
COD = chemical oxygen demand.

Source: Division Reclamaciones Negociado Planificacion, Calidad de Aqua, 1981.

stations exceed the Puerto Rico Class SD (Commonwealth of Puerto Rico, EQB, 1976) water quality standards for these parameters. At Station 1, elevated levels of total phosphorus, nitrate, TKN, BOD, and COD indicate the influence of the septic tank discharge from Tintillo Ward into El Toro Creek. Concentrations for these parameters at Station 2 are from two to five times lower, indicating that the quality of El Toro Creek improves as it flows through FTB. Phosphorus levels encountered in El Toro Creek will exceed 100 micrograms per liter (ug/l), the desired goal for the prevention of plant nuisances in streams (EPA, 1976).

Surface water pollution at El Toro Creek has been a continuing problem at FTB due to an upstream, offpost septic tank discharge into the creek. Complaints of odor have called attention to the problem, but no solutions have been implemented. Activities at FTB do not cause any significant degradation to the surface waters on the installation.

2.3.2 SUBSURFACE

No subsurface water quality data are available for FTB. Chemical analysis for the ground water in the San Juan area collected by USGS in 1976 (Anderson, 1976) is presented in Tables 2.3-2 and 2.3-3. These data include routine water quality parameters for the characterization of the ground water, but do not include pesticide or trace metals analysis. The data (Table 2.3-2) indicate that water samples from the Aguada Limestone aquifer are alkaline (pH 7.7 to 8.3), moderately high in dissolved solids concentration (293 to 4,550 mg/l), and hard (110 to 1,100 mg/l), but otherwise of good quality. Ground water from the Cibao and San Sebastian Formations is considerably less mineralized than the water from the limestone aquifer. A summary of analysis of water from these locations is given in Table 2.3-3. The median concentrations of dissolved solids, hardness, and bicarbonate for the Cibao and San Sebastian Formations are 363, 195, and 226 mg/l, respectively; whereas, the median concentrations for the Aguada Limestone formations are 525, 295, and 300 mg/l, respectively.

Table 2.3-2. Summary of Chemical Analyses of Water from Wells in the Aguada Limestone Aquifer (15 Samples)

Parameter	Concentration (mg/l unless noted)			
	Minimum	Maximum	Average	Median
Silica	9.5	52	29	30
Calcium	23	190	93	77
Magnesium	5.4	160	28	18
Sodium	20	1,570	205	83
Potassium	0.6	17	3.7	2.2
Bicarbonate	160	396	285	300
Sulfate	3.8	330	56	24
Chloride	22	2,400	330	120
Fluoride	0.0	0.9	0.2	0.15
Nitrate	0.0	12	2.6	0.9
Dissolved Solids	293	4,550	867	525
Hardness	110	1,100	344	295
Conductance (umhos*)	517	7,680	1,500	920
pH (units)	7.[illegible]	8.3	--	7.8
Temperature (°C)	25	27.8	26.1	26

* umhos = micromhos.

Source: Anderson, 1976.

Table 2.3-3. Summary of Chemical Analyses of Water from Wells in the Cibao and San Sebastian Aquifers (17 Samples)

Parameter	Concentration (mg/l unless noted)			
	Minimum	Maximum	Average	Median
Silica	9.6	56	38	43
Calcium	14	92	57	58
Magnesium	2.3	20	12.9	11
Sodium	10	120	57.5	46
Potassium	1.2	46	5.8	3
Bicarbonate	120	364	230	226
Sulfate	6	170	47	23
Chloride	17	190	57	34
Fluoride	0.0	0.4	0.14	0.1
Nitrate	0.0	85	7.5	0.6
Dissolved Solids	253	619	400	363
Hardness	45	290	195	195
Conductance (umhos)	361	1,070	645	625
pH (units)	7.3	8.5	--	8.0
Temperature (°C)	24.5	27.5	25.7	25.5

Source: Anderson, 1976.

2.3.3 POTABLE WATER

Potable water at FTB is purchased from PRASA. The water, provided by two separate water treatment facilities, enters the FTB potable water system through two separate lines. Approximately 35 percent of FTB potable water enters through the main gate intake line from the Sergio Cuevas Water Treatment Plant (WTP), located approximately 10 km east of the installation. The remainder comes through the south gate line from the Guaynabo filtration plant located approximately 3 km south of the installation. Potable water monitoring by FTB DEH is not currently required, as they do not provide onsite treatment of the purchased water.

Chemical data for the treated water supplied to FTB from PRASA have been collected as part of the U.S. Army Drinking Water Surveillance Program (USADWSP) during the period 1972 to 1977 (USAEHA, 1976). Chemical data were also collected in 1979 by USAEHA (1979) as part of a potable/recreational water quality survey. Data from these studies, presented in Table 2.3-4, indicate that the water meets the National Interim Primary Drinking Water Regulations (NIPDWR) (EPA, 1982b) and National Secondary Drinking Water Regulations (NSDWR) (EPA, 1982c), with the exception of fluoride at the South Intake Station. The fluoride concentration was 0.02 mg/l over the standard of 1.4 mg/l at this location. No data are available for pesticides and volatile organics.

2.4 AIR QUALITY AND NOISE

The location of FTB in an area of heavy industry makes the installation subject to the impact of air pollution from nearby sources. These industrial sources include an oil refinery and a oil-fired power plant. In the past, a glass factory and a cement manufacturing facility also operated near the installation. The ambient air quality has improved since the closure of the cement and glass plants and will continue to improve as the EQB proceeds with compliance schedules for the other industries in the area.

Table 2.3-4. Laboratory Analysis of Potable Drinking Water at FTB

Parameter	USADWSP 1972-1976		USAEHA 1979	
	TW01*	TW02*	East† Intake	South† Intake
Barium (mg/l)	<0.30	<0.30	--	--
Cadmium (mg/l)	<0.005	<0.005	<0.005	<0.005
Chromium (mg/l)	<0.025	<0.025	<0.005	<0.005
Fluoride (mg/l)	--	--	<0.95	1.42
Lead (mg/l)	0.011	0.007	<0.005	<0.005
Mercury (mg/l)	<0.0002	<0.0002	--	--
Selenium (mg/l)	<0.010	<0.010	--	--
Silver (mg/l)	<0.025	<0.025	<0.001	<0.001
Chloride (mg/l)	--	--	25.5	29.6
Copper (mg/l)	0.028	<0.057	<0.3	<0.3
Iron (mg/l)	<0.100	<0.100	<0.003	<0.003
Manganese (mg/l)	<0.03	0.032	<0.05	<0.05
pH (mg/l)	--	--	8.04	7.98
Sulfate (mg/l)	--	--	38	36
TDS (mg/l)	--	--	178	214
Acidity (mg/l)	--	--	2.9	1.9
Alkalinity (mg/l)	--	--	106.1	124.5
Calcium (mg/l)	27.4	45.9	20.7	25.8
Hardness (mg/l)	--	--	128.6	142.7
Potassium (mg/l)	3.44	4.07	2.25	2.60
Magnesium (mg/l)	7.1	13.3	17.7	21.8
Sodium (mg/l)	18.0	20.1	35.3	43.5
Specific Conductance (mg/l)	--	--	328	360
Chlorine Residual (mg/l)	--	--	1.0-1.5	0.4-0.6
Gross α (pCi/l)	1.2	<1.2	--	--
Gross β (PCi/l)	3.4	3.5	--	--

* TW01 = Treated water east intake.
TW02 = Treated water south intake.
† East Intake = Sergio Cuevas WTP.
South Intake = Guaynabo WTP.

pCi/l = picocuries per liter.

Sources: USAEHA, 1976, 1979.

FTB holds one air permit (No. 32-0581-0389-II-0) for the operation of a tankless water heater in Bldg. 390 (Commonwealth of Puerto Rico, EQB, 1981). No other permits are necessary.

There are no significant sources of noise at FTB.

2.5 IMPACTS ON BIOTA

The only known current impact upon FTB biota is the water quality degradation in El Toro Creek, which probably impacts fish and invertebrate populations present in the creek. Current land use and past land use changes have impacted biota via habitat reduction and changes. However, many areas of habitat remain, and the current activities and operations on FTB are not expected to have any significant impact on installation biota.

3.0 INSTALLATION ASSESSMENT

3.1 FINDINGS

3.1.1 METEOROLOGY

The San Juan area climate is classified as tropical marine, with a small annual temperature range of 27.2°C to 23.9°C. The annual average precipitation of 152 cm is seasonally distributed, with the maximum occurring from July to October.

3.1.2 GEOLOGY

FTB is underlain by rocks of the Cibao and San Sebastian Formations of Oligocene age. These formations consist of alternating beds of sand, gravel, limestone and clay. At FTB, the Cibao and San Sebastian Formations are generally covered by a clayey Quaternary alluvium. The Aguado limestone also occurs on the installation forming a mogote on the northern boundary. Site-specific geological data are discussed in Sec. 3.1.15.

3.1.3 HYDROLOGY

FTB is drained by El Toro Creek, which originates in a residential area south of the installation and discharges into the Malaria Control Canal and then into San Juan Bay. Puerto Rico Cement Corp. Lake is a small, privately owned pond located in the center of the installation. FTB lies in the recharge zone of the aquifer in the San Sebastian and lower Cibao Formations. Regional ground water flow is toward the coast, with local perturbations due to topography and the variable lithology of the sediments.

3.1.4 BIOTA

The biota of FTB is partly characterized as natural vegetation and wildlife and partly as cultivated maintained lawn or parklike habitats. Aquatic habitats are degraded to some extent by offpost sewage effluents; however, overall biota is not significant impacted by installation operations and activities. Although there are three Federal endangered species on the site, they inhabit areas not impacted by the facility operations.

3.1.5 LEASES AND AGREEMENTS

Leases and agreements effective on FTB primarily involve leases, easements, permits, and licenses for utility rights-of-way and use of installation buildings and lands. None of these involve the use, generation, or disposal of toxic or hazardous subsances.

Two parcels at hand have been declared excess and are awaiting final disposition. One parcel is currently leased to PRPA. The second parcel consists primarily of unimproved wetlands.

FTB also has real property responsibility for 12 USAR centers located throughout the Commonwealth of Puerto Rico.

3.1.6 LEGAL CLAIMS

The installation assessment has indicated no filing of legal claims involving the use, generation, handling, or disposal of toxic and hazardous substances. There have been no claims involving offsite migration of chemicals or other toxic and hazardous materials.

3.1.7 INDUSTRIAL OPERATIONS

Industrial operations are associated with maintenance and repair of wheeled and tracked vehicles, groundkeeping equipment, buildings, road, and utilities. Reportedly, past activities were similar to current operations, although the locations of activities have changed.

3.1.8 LABORATORY OPERATIONS

Laboratories at FTB include several clinical laboratories operated by MEDDAC and DENTAC. Reportedly, dilute waste chemical reagents from these sources are discharged to the sanitary sewer and are effectively diluted by flow to the STP. Silver from X-ray and photographic fixative solutions is reclaimed and turned over to DPDO at Roosevelt Roads Naval Station on a quarterly basis. Infectious and contaminated wastes are frozen and taken weekly to the VA hospital in San Juan where they are incinerated.

3.1.9 MATERIEL PROOF AND SURVEILLANCE TESTING

Until the 1960s, a small arms test firing facility was located in Bldg. 556A. No problems were associated with the operation of this facility. Reportedly, no other materiel proof or surveillance testing have occurred at FTB.

3.1.10 TRAINING AREAS AND RANGES

No ranges or training areas exist on the installation. Records indicate no past or current use of NBC agents or simulants.

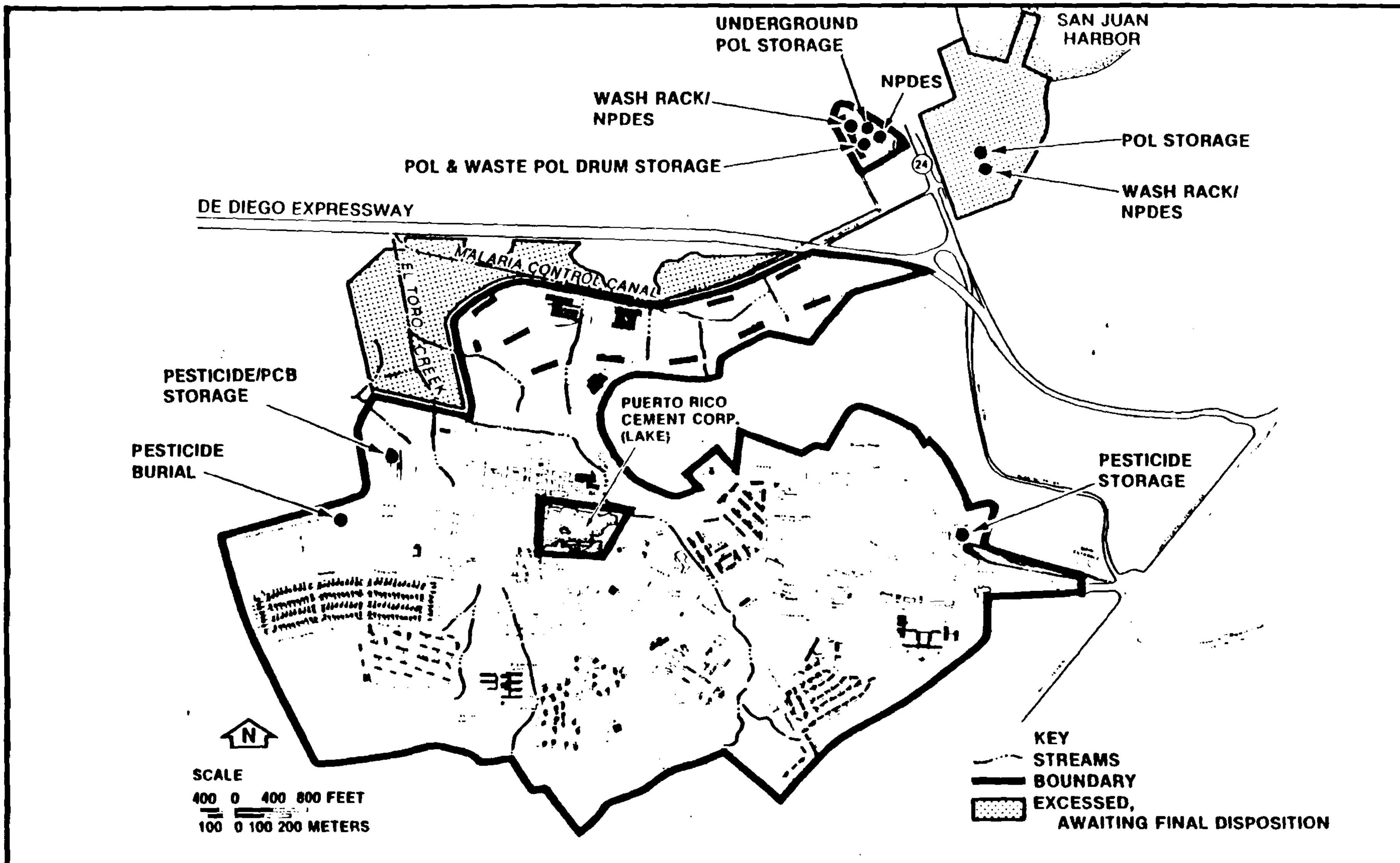
3.1.11 TOXIC/HAZARDOUS MATERIALS (HANDLING AND STORAGE)

Pesticides

Pesticides are currently stored in Bldg. 556, Bldg. 138, and a shed adjacent to Bldg. 556. At the time of the site visit, all three of these storage areas (Fig. 3.1-1) lacked facilities (e.g., continuous curbing) to control spillage as recommended by USAEHA (1975b) guidelines and Federal (EPA, 1982f) regulations. Pesticide mixing areas located adjacent to Bldg. 138 and Bldg. 556 also lacked continuous curbing to control spillage (USAEHA, 1975b). Reportedly, funding has been approved for the construction of new pest control facilities which will comply with all Federal regulations. Bids are to be solicited in the near future.

PCBs

A survey of in-service transformers is currently being conducted by DEH to determined proper marking requirements. Approximately two-thirds of the 180 transformers have been surveyed to date at a rate of 3 to 6 per month. Remaining transformers are in use, in good condition, and will be sampled as manhours become available. Since November 1982, a



SOURCE: ESE, 1983.

Figure 3.1-1 **POTENTIAL CONTAMINATION MAP -- FORT BUCHANAN**	**Prepared for:** **U.S. Army Toxic and Hazardous Materials Agency** **Aberdeen Proving Ground, Maryland**

concrete base and retaining wall for the storage of PCB transformers and the containment of possible spills have been in use. At the time of the site visit, three PCB-contaminated transformers had been stored in this area for 6 to 8 months. A special hazardous waste storage facility is projected for construction in FY83. This facility will contain an approved PCB storage area which will meet Federal regulations.

Radiological Materials

Radiological materials stored on FTB include a Radiac survey meter and a soil and density meter, with NRC license authorizing use of these sets held by the U.S. Army Communications and Electronics Materiel Readiness Command (CERCOM) and TARCOM, respectively. Radioisotopes are not currently being used by any medical activites.

CB Agents

No record was found of the manufacture, storage, or use of lethal CB agents or munitions at FTB.

3.1.12 POL HANDLING AND STORAGE

The types of POL used at FTB include motor gas, diesel fuel, heating fuel oil, petroleum-based solvents, hydraulic fluids, and lubricating oil. Total underground POL storage capacity is 70,000 gal. Total aboveground storage capacity is 2,500 gal.

The Hapag-Lloyd Co., a lessee, maintains a 2,000-gal aboveground diesel fuel tank at the Army Terminal. Subseqent to the site visit, facilities for containing potential spillage were provided (Fig. 3.1-1), as required by Army and Federal regulations (U.S. Army 1978; EPA, 1982a). The Hapag-Lloyd area is drained to by a central storm drain directly to the adjacent harbor.

Incoming and waste POL (lubricating oil, hydraulic fluids, and solvents) are stored in 55-gal drums near Bldg. 653 at the AMSA facility. The storage area is located adjacent to a storm drain which feeds an offpost drainage ditch approximately 90 m from the storage area (Fig. 3.1-1). Approximately 825 gal (i.e., 15 drums) of waste POL were stored at the time of the site visit. This quantity combined with the 825 gal of incoming POL exceeds 1,000 gal. This storage area has been provided with facilities for containing spillage (U.S. Army, 1978; EPA 1982a).

Unexplained losses of motor gas and diesel fuel were detected during the second quarter of 1982 from underground tanks at Bldg. 654 of the AMSA facility. The tanks have been pumped empty and temporarily removed from service. Tank specialists from the Texaco refinery in Bayamon reportedly were retained to evaluate the tanks' integrity. One of the two tanks in question was found leaking and was repaired.

3.1.13 SANITARY WASTEWATER TREATMENT

Sanitary wastewater on FTB is discharged to the PRASA sanitary sewer system for treatment at the STP in Bayamon. Total sewage flow from FTB is estimated to be 944 m^3 per/day, or 66 percent of the facility's potable water usage. No problems have been reported at the Bayamon STP as a result of flow from FTB.

3.1.14 INDUSTRIAL WASTEWATER TREATMENT

Industrial wastes generated on FTB include waste POL, wash rack wastewater, spent photographic solutions, waste paint and thinner, and metal scrap. Four of the five wash racks discharge to storm sewers, but are not permitted under NPDES, contrary to Federal regulations (EPA, 1982a). The fifth wash rack discharges to the sanitary sewer and is equipped with an oil/water separator. However, funds have reportedly been requested to construct the necessary oil trap in order to connect the wash rack discharges to the sanitary sewer.

3.1.15 LANDFILLS/DISPOSAL AREAS

Solid waste is contract hauled to the city of San Juan landfill. Construction debris and tree trimmings are diposed of in an onsite landfill. Although this landfill is not permitted, EQB has given informal approval of the operation. During the site visit, the landfill gate was left unlocked and open, contrary to SOP. Unrestricted access to the landfill is of concern because of its proximity to the elementary school.

In 1968, a truckload (approximately 1 ton) of miscellaneous pesticides reportedly was buried in a shallow trench near the northern installation boundary. The exact identification of these materials is unknown.

In 1980, PRASA emplaced a potable water supply main across FTB connecting the San Juan and Bayamon water supply systems. This line consists of a 66-in diameter reinforced-concrete pipe reportedly laid in a trench about 3 m deep. The pipe is made up of 8-ft long joints sealed with neoprene gaskets. The PRASA pipe trench passed close to the pesticide burial and may have intersected it. This pipe carries finished water to the public distribution system. Reportedly, the water main is depressurized a few times times per year during maintenance periods; however, the probability of infiltration into the pipe is believed to be low.

A concern was the potential for the buried pesticides to migrate into the ground water. The Mucarabones Sand, a local aquifer under study by the USGS as a potential alternate potable water supply source, underlies the burial area (FTM DEH, 1982). This aquifer is not currently developed as a potable water source in the FTB area. Although the pesticide trench is in a clay soil of low to moderate permeability, insufficient cover exists to preclude infiltration of rainfall into the trench. Two potential pathways existed for the migration of the pesticides into the ground water. First, the pesticides might be carried directly downward from the trench into the aquifer by water percolating through the soil. Second, if the two excavations intersect or nearly intersect, the pesticides might have migrated from the pesticide burial trench to the PRASA pipeline trench and then move through the higher permeability materials reportedly present in the PRASA pipe trench to a zone where the PRASA pipeline was not excavated in clay but in more permeable sediments. The thickness of the clay underlying the pesticide burial trench, the depth to ground water below the pesticide trench, and the separation between the pesticide burial trench and the PRASA trench were unknown at the time of the site visit.

Due to the uncertainties regarding the relative position of the two excavations, the exact chemical identity of the pesticides and the composition and geometry of the subsurface materials, USATHAMA conducted a limited contamination assessment subsequent to the IIA site visit. The program consisted of two components:

1. A limited geotechnical task, and
2. A limited sampling and analysis task.

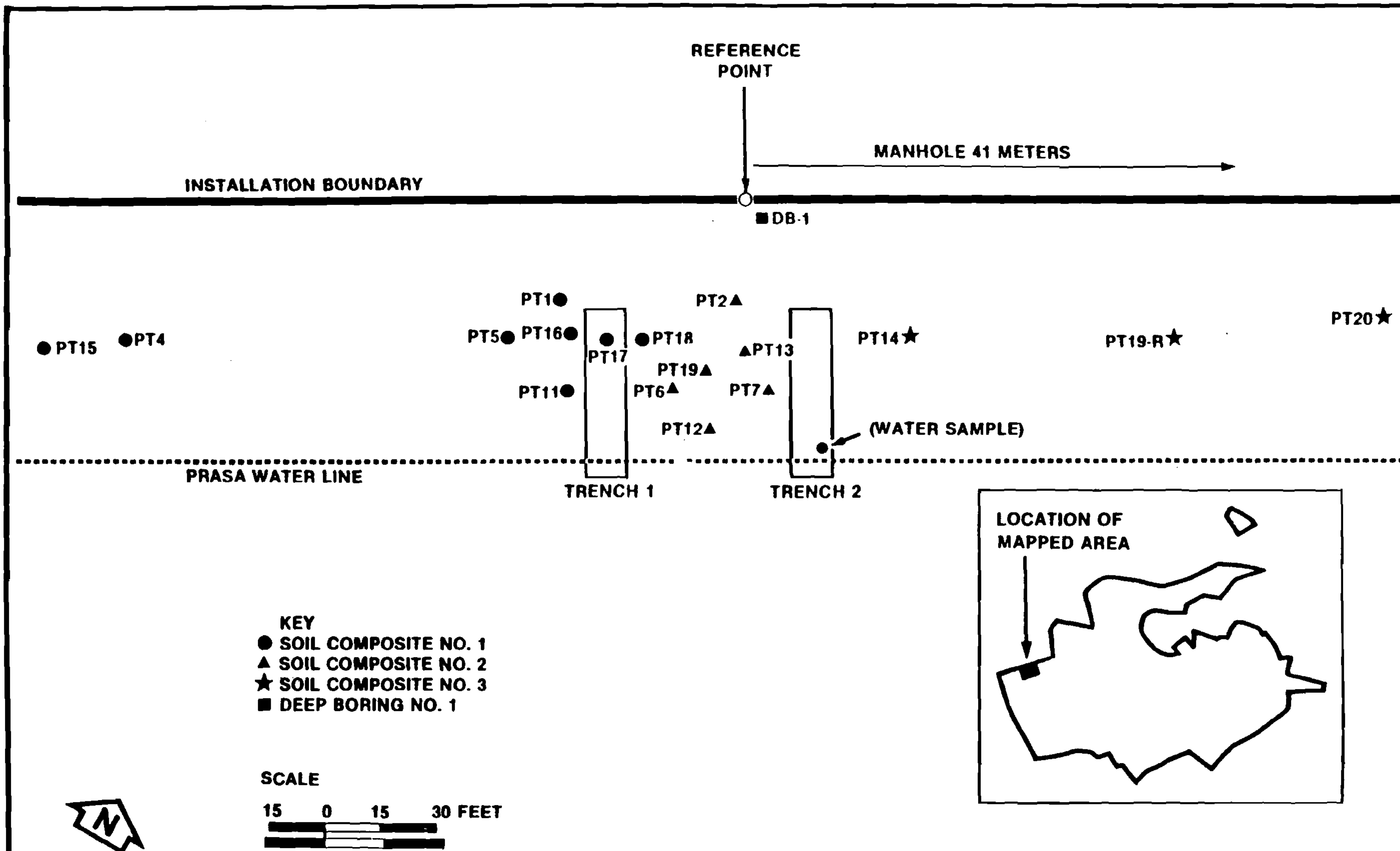
The overall objective of the assessment was to provide sufficient site-specific data to allow an analysis of alternatives for remedial action. The objective of the geotechnical task was to provide detailed information on the geometry of the pesticide burial, the nature of the geologic environment surrounding the burial, and the proximity of the pesticide burial to a PRASA potable water main. The objectives of the sampling and analysis task were to identify the pesticides present in the burial site and to analyze any ground water encountered during the geotechnical task for those pesticides detected in the burial site.

The geotechnical task consisted of three elements:

1. Shallow soil borings,
2. Excavation of trenches, and
3. One deep soil boring.

Details of the geotechnical program are given in App. E.

A total of 17 shallow soil borings were performed in the area of the reported burial (see Fig. 3.1-2 for locations). Witnesses to the burial verified the approximate boundaries of the burial prior to the start of the boring program. The purpose of these borings was to characterize the shallow subsurface and to obtain samples of the buried pesticides



SOURCE: ESE, 1983.

Figure 3.1-2
FORT BUCHANAN SOIL BORING LOCATIONS (APRIL 18-22, 1983)

Prepared for:
U.S. Army Toxic and Hazardous Materials Agency
Aberdeen Proving Ground, Maryland

and contaminated soil for chemical analysis. Borings ranged in depth from 3 to 8 ft.

No evidence of the pesticide burial other than the presence of disturbed soil was observed in any of the shallow soil borings. All the borings encountered heavy clay soils with varying but minor amounts of black ferrous nodules, limestone fragments, and manufactured crushed stone. The borings were made in the area designated by the witnesses to the burial and indicated by the visual evidence. Logs of individual shallow soil borings are presented in App. D.

Two trenches were excavated perpendicular to the installation boundary by a backhoe. Both trenches encountered the PRASA line, but neither revealed any evidence of pesticides, although disturbed soil was observed in both trenches. No granular backfill was observed around the PRASA pipe. The trenches were excavated in the area designated by the witnesses to the burial and indicated by visual evidence. Logs of each trench are presented in App. D.

One deep soil boring was augered to a depth of 40 ft. This boring encountered clay to a depth of 25 ft. Below the clay the boring encountered about 5 ft of sand and then 10 ft of weathered sandy limestone. No evidence of pesticides was observed in the deep boring. No distinct water table was encountered in this boring, although the sandy limestone was very moist. A water level of 33 ft below ground surface was measured the following day. The stratigraphy encountered and temporary well construction details are shown in Fig. 3.1-3. The deep boring was located north of the area where the pesticides were reported to have been buried. This is topographically downgradient of the reported burial site and also immediately adjacent to it. Thus, a ground water quality sample obtained at this location represents the ground water most likely to be impacted by any migration of pesticides. The location of the elements of the geotechnical task are shown in Fig. 3.1-2. Geotechnical methodologies and equipment are detailed in App. E.

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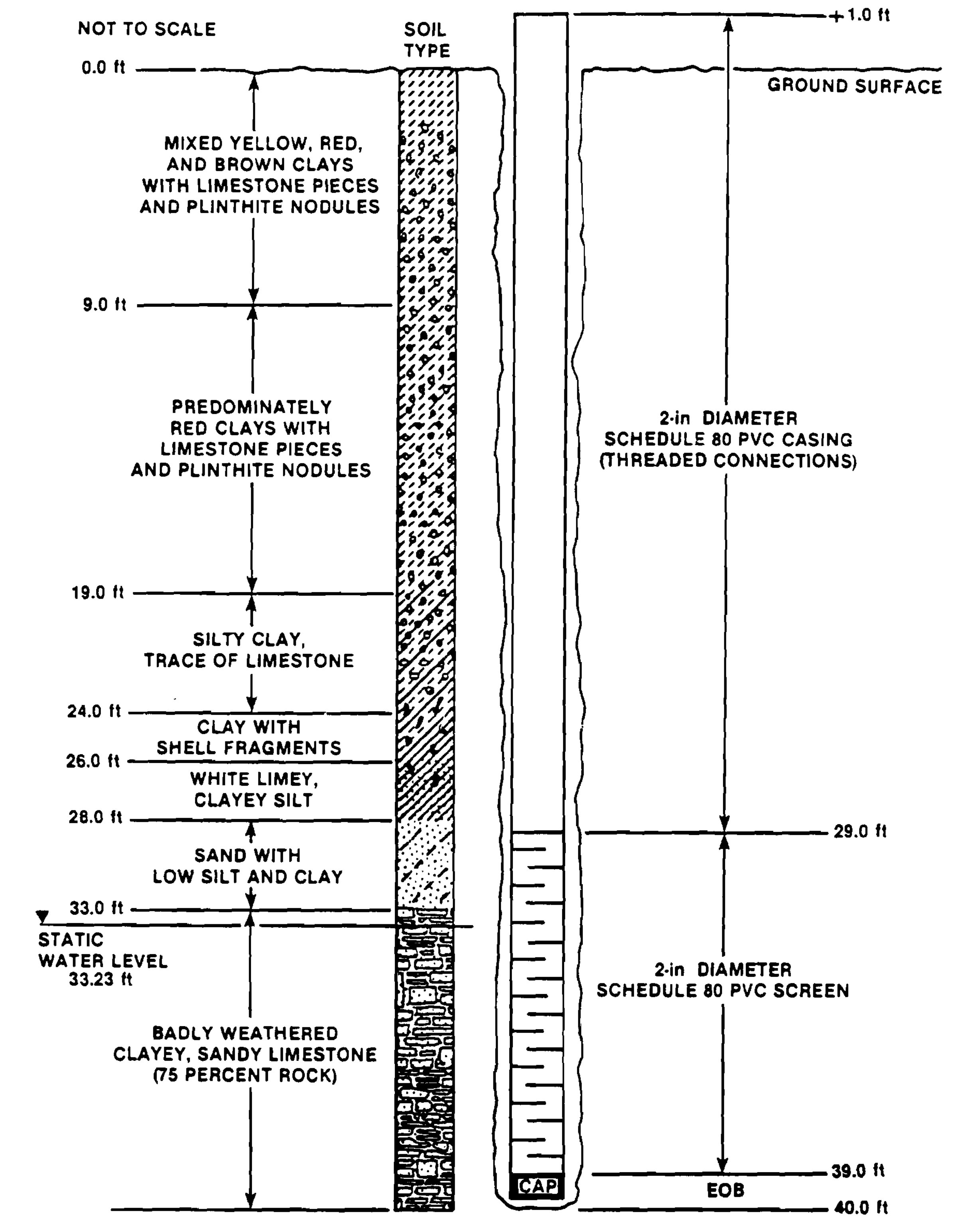

NOTE: INSTALLED APR. 21, 1983,
REMOVED AND SEALED APR. 23, 1983.

SOURCE: ESE, 1983.

Figure 3.1-3 TEMPORARY MONITOR WELL (BORING DB-1) AT FORT BUCHANAN	**Prepared for:** **U.S. Army Toxic and Hazardous Materials Agency** **Aberdeen Proving Ground, Maryland**

The sampling and analysis task consisted of three elements:

1. Sampling of shallow soils in the pesticide burial trench,
2. Water quality sampling of the deep soil boring and ESE trenches, and
3. Laboratory analysis of these soil and water samples for pesticides.

Seventeen soil samples were collected from the shallow soil borings. The bottom 2 ft of each shallow boring were retained as a sample. These were composited in the laboratory into three samples for chemical analysis to reduce analytical costs. Fig. 3.1-2 shows which individual samples were composited. Specific compositing procedures are presented in App. F. Two water quality samples were collected, one from the deep boring and the other from one of the trenches (see Fig. 3.1-2).

Soil samples were analyzed according to the methods listed in Table 3.1-1. Water samples collected during this task were analyzed only for those analytes found in the soils. Three organochlorine pesticides were detected in two of the soil composites, and two of those were detected in the third composite. Table 3.1-2 summarizes the analytical data for the soil samples. The remainder of the data are presented in App. G.

None of the compounds detected in the soils were detected in the water samples.

A complete listing of the chemical analysis data is included as App. G.

Laboratory permeability tests performed on a sample obtained from the deep boring have shown the vertical hydraulic conductivity of the clay soils to be extremely low [6.6 x 10^{-9} centimeters per second (cm/sec)]. Since only trace levels of a few pesticide compounds were detected in the soils at the reported pesticide burial area and these compounds were not detected in the water sample from the deep boring, no evidence for the migration of pesticide compounds from the burial area

Table 3.1-1. Soil Analysis Methods

Soil Composite

Organochlorine Pesticides USATHAMA Method 2M	Organochlorine Herbicides USATHAMA Method 8-N	Acid/Base-Neutrals Fractions by GC/MS USATHAMA Methods 1Y, 2A
Compounds	Compounds	Miscellaneous Other Pesticides
Aldrin	2,4-D	All other pesticides that are detectable by GC techniques.
alpha-BHC	2,4,5-T	
beta-BHC	Silvex	
gamma-BHC	Dicamba	
delta-BHC		
Chlordane		
DDD		
DDE		
DDT		
Dieldrin		
Endosulfan I		
Endosulfan II		
Endosulfan sulfate		
Endrin		
Heptachlor		
Heptachlor epoxide		
Toxaphene		

* GC/MS = gas chromatography/mass spectroscopy.

Source: ESE, 1983.

Table 3.1-2. Analytical Data for Soil Samples

Compound	Composite 1	Composite 2	Composite 3
Chlordane	0.040	0.200	0.090
DDE PP	<0.003	0.006	0.004
Heptachlor	0.004	0.010	0.010

Note: All values in ug/g, dry weight.

Source: ESE, 1983.

exists. In addition, the geologic situation at the burial site does not favor migration of contaminants either downward or along the PRASA pipeline.

Vertical migration of pesticides to the water table is extremely unlikely because little infiltration occurs at the reported burial site due to the low permeability of the soils as evidenced by the very dry condition of the soils encountered by the borings. Any water which does infiltrate would move slowly. Since no water table exists within the depth of the reported pesticide burial, lateral movement of pesticides is prevented. The water sampled from the ESE trench was probably due to leakage from the PRASA pipeline and thus has little significance due the short contact time with the soil. The lack of granular backfill around the PRASA pipeline eliminates that as a potential pathway for migration of contaminants. The pesticides detected in the soil are all insecticides and are unlikely to have been in use in the immediate area. Typically, these materials would be used in and around occupied buildings to control insects and not along the installation perimeter fence. Although the levels of pesticides detected in the composite samples were low, somewhat higher levels may exist in individual samples. The highest concentration of any pesticide detected was 0.200 microgram per gram (ug/g) of chlordane in soil composite No. 2. This composite consisted of six samples, and thus the highest possible concentration in any single sample of the composite is 1.2 ug/g. There are no Federal or Puerto Rico criteria for chlordane in soil. USAEHA has considered levels of less than 5 ug/g of any pesticide in soil as not excessive. This position is based on samples analyzed from 34 Army installations and on published data from Crockett et al. (1974) (USAEHA, 1975c).

3.1.16 DEMOLITION AND BURNING GROUNDS

Records indicate no past or current demolition or burning ground areas and no EOD activities onsite.

3.1.17 WATER QUALITY

Surface water quality data collected at El Toro Creek by EQB show that concentrations of total phosphorus, total coliform, fecal coliform, and color exceed the Puerto Rico Class SD water quality standards. The quality of El Toro Creek is poor just south of FTB at Tintillo Ward, indicating the influence of the septic tank discharge from Tintillo Ward. The quality of El Toro Creek improves as it flows through FTB. Activities at FTB do not cause any significant degradation to the surface waters on the installation.

Ground water data collected by USGS for the San Juan area indicate that the water from the Aguada Limestone aquifer is alkaline, moderately high in dissolved solids, and hard, but otherwise of good quality. Ground water from the Cibao and San Sebastian Formations is considerably less mineralized than the water from the Aguada Limestone aquifer. No subsurface water quality data are available for FTB.

Potable water at FTB is purchased from PRASA and is provided by two separate water treatment facilities. Chemical data for the treated water supplied to FTB indicate that the treated water meets NIPDWR and NSDWR, with the exception of fluoride at the South Intake Station (Commonwealth of Puerto Rico, 1973). The fluoride concentration exceeded the standard of 1.4 mg/l by 0.02 mg/l at this location during the period 1972 to 1977 (USAEHA, 1976). Pesticide and volatile organic analysis were not included in these data.

3.1.18 AIR QUALITY AND NOISE

FTB holds one air permit (No. 32-0581-0389-II-0) for the operation of a tankless water heater. No other permits are required. There are no significant sources of noise at FTB.

3.2 CONCLUSIONS

1. Reportedly, 1 ton of unidentified pesticides was buried in a shallow trench near the northern installation boundary in 1977. However, a limited contamination assessment indicates that only trace levels of pesticides exist in the soil, and that migration of these compounds is not occurring.
2. The following handling or waste disposal practices, while not leading to offpost migration, are not in compliance/conformance with designated regulations or guidelines:
   a. The existing pesticide storage facilities (Bldg. 138 and a shed adjacent to Bldg. 556) and mixing areas (adjacent to Bldgs. 138 and 556) lack facilities (e.g., continuous curbing) to control spillage. In addition, the shed adjacent to Bldg. 556 lacks facilities (e.g., walls) to ensure that pesticides remain dry. Pesticides are improperly stored in the Entomology Office area of Bldg. 556 (USAEHA, 1975a; EPA, 1982f). Subsequent to the site visit, funding reportedly has been approved for the construction of new pest control facilities which will comply with all Federal regulations. Bids are to be solicited in the near future.
   b. A survey of in-service polychlorinated biphenyl items is currently being conducted; however, approximately only two-thirds of the in-service transformers have been surveyed to date (EPA, 1982e).
   c. Of the four wash racks on FTB and the one on the U.S. Army Reserve Center in Bayamon, four discharge to the storm sewer system (without National Pollutant Discharge Elimination Service permits); the remaining wash rack (Bldg. 538 on FTB) discharges to the sanitary sewer. In addition, two wash racks are not equipped with oil/water separators (U.S. Army, 1978; EPA, 1982a).
   d. No evidence of contamination was uncovered to adversely affect the excessing of the parcel of land formerly designated as the Army Terminal (extending from Highway 24 to San Juan Bay) and the parcel of land located adjacent to the De Diego Expressway on the northern portion of FTB.

3.3 RECOMMENDATIONS

1. That no survey be conducted by USATHAMA at this time.

That FTM should:

2a. Properly store pesticides,

b. Continue efforts to ensure appropriate marking of in-service transformers in accordance with Federal regulations,

c. Bring the wash racks into compliance with Army and Federal regulations, and

d. Continue with excessing actions as appropriate.

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APPENDIX A

LEASES AND AGREEMENTS

ACTIVE OUTGRANTS

INST. NO.	GRANTEE	EXP DATE	INSURANCE DATE	RENTAL	DESCRIPTION
			FORT BUCHANAN		
1-69-3011	PRPA 037	Day to Day Basis		Maint/Re-Pair & Protection	37.64 AC & Bldgs Army Terminal Area
1-71-3017	Carib Gulf	12/8/80	None	$100/ANN	36 SF of land for Mooring Bollard
-71-3019	PRHA	Day to Day Basis	5/1/81	$11,400 ANN	6.20 Ac & Bldgs 1404 1405,1408, & 1409
1-72-3011	DTPW	9/17/80	None	None	Bayamon North By-Pas Road
1-75-3002	BPPR	12/31/94	None	3900/ANN	0-18 Acres of Land
1-76-3010	IAU	6/30/81	12/1/80	Maint/Re-pairs	Bldgs 219 & 220 0.45 Ac of Land
EASE 142-3	PRASA	2/15/2006	None	None	0.21 AC R/W for 12" Pipe Line Army Term
EASE 142-5	PR CEMENT	Perpet-ual	None	None	0.0181 Ac R/W for Road
ENG 228	CARIB GULF	3/18/2003	None	$780 ANN	R/W for 5 fuel pipeli
ENG 244	PR PULP & PAPER	6/24/2003	None	$35 ANN	0.33 Acres R/W for drainage line
ENG 266	PR GLASS CORP	6/2/2003	None	$35 ANN	R/W for drainage structure
ENG 3010	PRASA	4/18/2010	None	None	5.30 Ac, R/W for sewe

A C T I V E   O U T G R A N T S

INST. NO	GRANTEE	EXP DATE	INSURANCE DATE	RENTAL	DESCRIPTION
ENG 3370	DTPW	Perpet-ual	None	None	1.23 Ac R/W for road construction at main gate.
EASE ENG 5256	PRASA	7/27/84	None	$350 ANN	R/W for 10" sewer pipeline - El Toro c[illegible]
5323	PRWRA	10/5/2014	None	None	10.07 Ac (3 parcels) R/W for electric power lines
ENG 5758	PRWRA	10/10/2016	None	$200 Term	R/W for const. of a tunnel for sea water
2-69-3002	PRHA	INDEF.	None	None	0.9253 Ac R/W for roa[illegible] (No. 24 & De Diego)
2-74-3010	PRHA	Perpet-ual	None	None	R/W for Road Bayamon North By-Pass
[illegible]-74-3011	PRWRA	5/23/2018	None	$3,697 Term	3.63 Ac R/W for elec[illegible] power line (38KV)
2-76-3010	PRASE	Perpet-ual	None	None	66" water main
17-2-80-3013	PRTJG	5/4/81	None	None	Installation of 900 pair commo. cable
3-71-3013	DTPW	1/6/81	None	None	1.74 Ac R/W for road (Army Terminal) 12" sewer line
3-72-3011	PRARNG	6/30/82	None	None	15.72 Ac & Bldgs 462, 469,472,473,475,604, 615,616,617, & 627
3-72-3012	PRWRA	5/13/80	None	None	R/W for oil pipeline
3-72-3014	PR CEMENT	5/4/82	1/1/81	$150 Term	0.07 Ac R/W for 6" water pipeline from the lake
3-80-3011	CAP (PR WING)	10/31/84	None	None	Bldg 1321 Apts A (815 Sq Ft) & Bldg T-265 (2,000 Sq Ft)
[illegible]-75-3005	PRWRA	2/19/85	None	None	Air Sampling Monitor

ACTIVE OUTGRANTS

INST. NO	GRANTEE	EXP DATE	INSURANCE DATE	RENTAL	DESCRIPTION
3-78-3010	PRASA	6/30/83	None	None	90" Ø sewer pipeline
3-80-3013	DMI	3/2/82	None	None	Installation of a 48 DIA Storm sewer
3-80-3014	PRASA	6/30/84	None	None	Installation of a 90 dia pipe
PERMITS					
ENG-3030	HEW	INDEF	None	None	10.57 Ac & Bldgs 13&
ENG-3110	HEW	INDEF	None	None	8.98 Acres
4-72-3012	USCG	1/31/81	None	None	100 SF of land-aid t navigation (range li
4-74-3010	HEW	INDEF	None	None	24.37 Acres
-74-3011	HEW	INDEF	None	None	9.87 Acres
4-80-3010	USAF	10/31/84	None	None	Bldg 1321 Aprts A & Bldg T-265
4-78-3010	GSA 041	4/30/80	None	None	2.62 Acres & Bldg 60

STANDARD FORM 118
DECEMBER 1953
PRESCRIBED BY GENERAL
SERVICES ADMINISTRATION
REGULATION 2-IV-201.00
118-102

REPORT OF EXCESS REAL PROPERTY

1. HOLDING AGENCY NO. SJA-3 36

DATE RECEIVED (GSA use only)

2. DATE OF REPORT 12 Jan 67

GSA CONTROL NO. (GSA use only)

3. TO (Furnish address of GSA regional offices)
General Services Administration, Region 2
30 Church Street
New York, NY 10007

4. FROM (Name and address of holding agency)
San Juan Area Engineer Office
US Army Engineer District, Jacksonville, Fla.
P.O. Box 3829, San Juan, PR 00904

5. NAME AND ADDRESS OF REPRESENTATIVE TO BE CONTACTED
Mr. Marion H. Evans
Chief, Real Estate Branch
(See Block 4)

6. NAME AND ADDRESS OF CUSTODIAN
Post Engineer
Antilles Command, USARSO
Ft. Buchanan, P.R. 00934

7. PROPERTY IDENTIFICATION
Fort Buchanan Military Reservation
A general depot during WW II, recently a garrison, Personnel Center, Training Center, Housing, Post Facility.

8. PROPERTY ADDRESS (Give full location)
Fort Buchanan
San Juan, P. R.

9. SPACE DATA

USE	NUMBER OF BUILDINGS (1)	FLOOR AREA (Sq. ft.) (2)	NUMBER OF FLOORS (3)	FLOOR LOAD CAPACITY (4)	CLEAR HEADROOM (5)
A. OFFICE	8	18942	Gen.	Usually	Varies
B. STORAGE	90	659566	One	Hvy	"
C. OTHER (See 9 F)	33	74304	Floor	Cap.	"
D. TOTAL (From SF 118a)	131	752812			
E. GOV'T INTEREST: (1) OWNER	x				
(2) TENANT					

F. SPECIFY "OTHER" USE ENTERED IN C ABOVE
Spec. Purpose Facilities, Latrines, Pump Stations, Piers, Recreations, Hsg. Sentry Booths, etc. or Complex Military Reservation.

10. LAND

(From SF 118b)	ACRES
A. FEE	874.44
B. LEASED	0
C. OTHER	.03
D. TOTAL	874.47

11. COST TO GOVERNMENT

ITEM	SCHEDULE	COST
A. BUILDINGS, STRUCTURES, UTILITIES, AND MISCELLANEOUS FACILITIES	A (Col. d)	$ 9098286.00
B. LAND	B (Col. f)	x 182600.94
C. RELATED PERSONAL PROPERTY	C (Col. h)	
D. TOTAL (Sum of 11A, 11B, and 11C)		$ 9280886.94

E. ANNUAL PROTECTION AND MAINTENANCE COST (Government-owned or leased)
$45,000

12. LEASEHOLD(S) DATA (Use separate sheet if necessary)

A. TOTAL ANNUAL RENTAL	$
B. ANNUAL RENT PER SQ. FT. OR ACRE	$
C. DATE LEASE EXPIRES	
D. NOTICE REQUIRED FOR RENEWAL	
E. TERMINAL DATE OF RENEWAL RIGHTS	
F. ANNUAL RENEWAL RENT PER SQ. FT. OR ACRE	$

G. TERMINATION RIGHTS (in days)
LESSOR GOVERNMENT

13. DISPOSITION OF PROCEEDS
N/A

14. TYPE OF CONSTRUCTION
Military Camp (All types of Construction)
See SF 118a

15. HOLDING AGENCY USE
Class I Military Reservation, Uses Normal to operation of such a facility.

16. RANGE OF POSSIBLE USES
Multitude of possible uses, by sector and/or improvement.

17. NAMES AND ADDRESSES OF INTERESTED FEDERAL AGENCIES AND OTHER INTERESTED PARTIES

1 - Office of Economic Opportunity
Room 400 1200 19th St. N.W.
Washington, D.C. 20506
Attn: Mr. Howard Dewey

2 - U.S. Public Health Service
P. O. Box 9685
Santurce, P.R. 00908

3 - Commonwealth of P.R.
P.O. Box 8218
San Juan, P.R. 00909

18. REMARKS
This property has been screened against the known needs of the Department of Defense and the Coast Guard with negative results.
The provisions of Title 10, U.S. Code 2662 has been met.
Copy of Decontamination Statement attached. (See remarks regarding the two areas inserted below signatures)

19. REPORT AUTHORIZED BY

NAME: G. L. FRYER
TITLE: Chief, Real Estate Division
Jacksonville, Fla. District

SIGNATURE
Marion H Evans
MARION H. EVANS for G. L. Fryer

U. S. GOVERNMENT PRINTING OFFICE 16—69840-2

STANDARD FORM 118a
DECEMBER 1953
PRESCRIBED BY GENERAL SERVICES ADMINISTRATION
REGULATION 2-IV-201.00

BUILDINGS, STRUCTURES, UTILITIES, AND MISCELLANEOUS FACILITIES

SCHEDULE A—SUPPLEMENT TO REPORT OF EXCESS REAL PROPERTY

1. HOLDING AGENCY NO. SJA-36

2. PAGE 1 OF 7 PAGES OF THIS SCHEDULE

GSA CONTROL NO. (GSA use only)

3. ANNUAL RENTAL

LINE NO. (a)	HOLDING AGENCY BUILDING NO. (b)	DESCRIPTION (c)	COST (d)	OUTSIDE DIMENSIONS (e)		FLOOR AREA (Sq. ft.) (f)*	NO. OF FLOORS (g)*	CLEAR HEAD-ROOM (h)*	FLOOR LOAD RANGE (i)*	RESTRICTIONS ON USE OR TRANSFER OF GOVERNMENT INTEREST (j) Construction Type	Year
1	637	Gasoline Station	1500	NA	(c)	150	1	NA	NA	P	1942
2	620	Pier Whse Adm Off	696800	"	(b)	88265	2	"	"	P	1942
3	619	Berth Pier (13333 SY)	985700	"	-	-	-	"	"	P	1942
4	~~623~~	~~Berth Wharf (87 SY)~~	~~8000~~	~~"~~	~~-~~	~~-~~	~~-~~	~~"~~	~~"~~	~~P~~	~~1947~~
5	~~622~~	~~Ferry Slip~~	~~10306~~	~~"~~	~~-~~	~~-~~	~~-~~	~~"~~	~~"~~	~~P~~	~~1947~~
6	16910	Other Harbor Const (4444 SY)	1367800	"	-	-	-	"	"	P	1947
7	912	Small Arms Range	4400	"	-	-	-	"	"	P	1956
8	~~646~~	~~Marine Mnt Shop~~	~~2400~~	~~"~~	~~(b)~~	~~4512~~	~~1~~	~~"~~	~~"~~	~~S~~	~~1947~~
9	905	Grease Racks out	200	"	-	-	-	"	"	P	1954
10	901	Shop Bldg. out	500	"	(b)	400	1	"	"	S	1942
11	903	Shop Bldg. out	700	"	(b)	2400	1	"	"	S	1942
12	~~453~~	~~Dispatch Office~~	~~100~~	~~"~~	~~(a)~~	~~40~~	~~1~~	~~"~~	~~"~~	~~T~~	~~1941~~
13	732	Ammo. Ins. Bldg.	46100	"	(b)	5150	1	"	"	P	1941
14	736	Barricade	2000	"	-	-	1	"	"	P	1941
15	609	Tech Mnt Shop ✓	68600	"	(b)	22568	1	"	"	P	1942
16	650	PE Mnt Shop	55000	"	(b)	16000	1	"	"	S	1947
17	750	Igloo	9400	"	(b)	1617	1	"	"	P	1942
18	751	Igloo	9400	"	(b)	1617	1	"	"	P	1942
19	752	Igloo	9400	"	(b)	1617	1	"	"	P	1942
20	753	Igloo	9400	"	(b)	1617	1	"	"	P	1942
21	754	Igloo	9500	"	(b)	1617	1	"	"	P	1942
22	755	Igloo	9500	"	(b)	1617	1	"	"	P	1942
23	756	Igloo	9400	"	(b)	1617	1	"	"	P	1942
24	757	Igloo	9400	"	(b)	1617	1	"	"	P	1942
25	758	Igloo	9700	"	(b)	1617	1	"	"	P	1942
26	759	Igloo	9400	"	(b)	1617	1	"	"	P	1942
27	760	Igloo	11300	"	(b)	1617	1	"	"	P	1942
28	761	Igloo	9700	"	(b)	1617	1	"	"	P	1942
29	762	Igloo	9700	"	(b)	1617	1	"	"	P	1942
30	763	Igloo	9700	"	(b)	1617	1	"	"	P	1942
31	764	Igloo	9700	"	(b)	1617	1	"	"	P	1942
32	765	Igloo	9700	"	(b)	1617	1	"	"	P	1942
		TOTAL									

*Prefix figures with symbols to denote type of space, as follows: (a) for office; (b) for storage; (c) for other.

16—00481-1 U. S. GOVERNMENT PRINTING OFFICE

A-5

STANDARD FORM 118a
DECEMBER 1953
PRESCRIBED BY GENERAL SERVICES ADMINISTRATION
REGULATION 2-IV-201.00

BUILDINGS, STRUCTURES, UTILITIES, AND MISCELLANEOUS FACILITIES

SCHEDULE A—SUPPLEMENT TO REPORT OF EXCESS REAL PROPERTY

1. HOLDING AGENCY NO. SJA-36

2. PAGE 2 OF 7 PAGES OF THIS SCHEDULE

GSA CONTROL NO. (GSA use only)

3. ANNUAL RENTAL

LINE NO. (a)	HOLDING AGENCY BUILDING NO. (b)	DESCRIPTION (c)	COST (d)	OUTSIDE DIMENSIONS (e)	FLOOR AREA (Sq. ft.) (f)*	NO. OF FLOORS (g)*	CLEAR HEAD-ROOM (h)*	FLOOR LOAD RANGE (i)*	RESTRICTIONS ON USE OR TRANSFER OF GOVERNMENT INTEREST (j) Type	Construction Year
1	766	Igloo	9700	NA (b)	1617	1	NA	NA	P	1942
2	767	Igloo	9700	" (b)	1617	1	"	"	P	1942
3	768	Igloo	9700	" (b)	1617	1	"	"	P	1942
4	769	Igloo	9800	" (b)	1617	1	"	"	P	1942
5	770	Igloo	9800	" (b)	1617	1	"	"	P	1942
6	771	Igloo	9800	" (b)	1617	1	"	"	P	1942
7	772	Igloo	9700	" (b)	1617	1	"	"	P	1942
8	773	Igloo	9700	" (b)	1617	1	"	"	P	1942
9	774	Igloo	9700	" (b)	1617	1	"	"	P	1942
10	775	Igloo	9700	" (b)	1617	1	"	"	P	1942
11	776	Igloo	9700	" (b)	1617	1	"	"	P	1942
12	777	Igloo	9700	" (b)	1617	1	"	"	P	1942
13	778	Igloo	9700	" (b)	1617	1	"	"	P	1942
14	779	Igloo	9700	" (b)	1617	1	"	"	P	1942
15	780	Igloo	9700	" (b)	1617	1	"	"	P	1942
16	781	Igloo	9900	" (b)	1617	1	"	"	P	1942
17	782	Igloo	9900	" (b)	1617	1	"	"	P	1942
18	783	Igloo	9700	" (b)	1617	1	"	"	P	1942
19	784	Igloo	9900	" (b)	1617	1	"	"	P	1942
20	785	Igloo	9700	" (b)	1617	1	"	"	P	1942
21	786	Igloo	9700	" (b)	1617	1	"	"	P	1942
22	787	Igloo	9900	" (b)	1617	1	"	"	P	1942
23	788	Igloo	9700	" (b)	1617	1	"	"	P	1942
24	789	Igloo	9700	" (b)	1617	1	"	"	P	1942
25	790	Igloo	9800	" (b)	1617	1	"	"	P	1942
26	791	Igloo	14400	" (b)	2114	1	"	"	P	1942
27	792	Igloo	14400	" (b)	2114	1	"	"	P	1942
28	793	Igloo	9700	" (b)	1617	1	"	"	P	1942
29	794	Igloo	9800	" (b)	1617	1	"	"	P	1942
30	795	Igloo	9700	" (b)	1617	1	"	"	P	1942
31	796	Igloo	9700	" (b)	1617	1	"	"	P	1942
32	616	Cold Stor Whse	115200	" (b)	7888	1	"	"	P	1942
		TOTAL								

*Prefix figures with symbols to denote type of space, as follows: (a) for office; (b) for storage; (c) for other.

16—00811-1 U. S. GOVERNMENT PRINTING OFFICE

STANDARD FORM 118a
DECEMBER 1953
PRESCRIBED BY GENERAL SERVICES ADMINISTRATION
REGULATION 2-IV-201.00

BUILDINGS, STRUCTURES, UTILITIES, AND MISCELLANEOUS FACILITIES

SCHEDULE A—SUPPLEMENT TO REPORT OF EXCESS REAL PROPERTY

1. HOLDING AGENCY NO. SJA-36

GSA CONTROL NO. (GSA use only)

3. ANNUAL RENTAL

LINE NO. (a)	HOLDING AGENCY BUILDING NO. (b)	DESCRIPTION (c)	COST (d)	OUTSIDE DIMENSIONS (e)	FLOOR AREA (Sq. ft.) (f)*	NO. OF FLOORS (g)*	CLEAR HEAD-ROOM (h)*	FLOOR LOAD RANGE (i)*	RESTRICTIONS ON USE OR TRANSFER OF GOVERNMENT INTEREST (j) Construction Type	Year
1	618	Cold Stor Whse OUT	508900	NA (b)	28864	1	NA	NA	P	1955
2	604	Gen Purp Whse OUT	61300	" (b)	22168	1	"	"	P	1942
3	605	Gen Purp Whse OUT	61300	" (b)	20468	1	"	"	P	1942
4	606	Gen Purp Whse OUT	64100	" (b)	20968	1	"	"	P	1942
5	607	Gen Purp Whse	61300	" (b)	20468	1	"	"	P	1942
6	610	Gen Purp Whse OUT	61300	" (b)	20468	1	"	"	P	1942
7	611	Gen Purp Whse OUT	61300	" (b)	20468	1	"	"	P	1942
8	612	Gen Purp Whse	61300	" (b)	20468	1	"	"	P	1942
9	613	Gen Purp Whse	61300	" (b)	20468	1	"	"	P	1942
10	614	Gen Purp Whse	61300	" (b)	20468	1	"	"	P	1942
11	615	Gen Purp Whse ✓ OUT	61300	" (b)	20468	1	"	"	P	1942
12	651	Gen Purp Whse ✓	832200	" (b)	82944	1	"	"	P	1948
13	726	Gen Purp Whse	38600	" (b)	4235	1	"	"	P	1947
14	729	Gen Purp Whse	21500	" (b)	5863	1	"	"	P	1942
15	734	Gen Purp Whse	5800	" (b)	364	1	"	"	P	1944
16	741	Gen Purp Whse	3300	" (b)	200	1	"	"	P	1942
17	742	Gen Purp Whse	9100	" (b)	1250	1	"	"	P	1942
18	743	Gen Purp Whse	35100	" (b)	4200	1	"	"	P	1942
19	744	Gen Purp Whse	78500	" (b)	20468	1	"	"	P	1942
20	608	Whse	61300	" (b)	20468	1	"	"	P	1942
21	624	MHE Bldg OUT	8200	" (b)	673	1	"	"	P	1957
22	~~642~~	~~Gen Purp Whse~~	~~8900~~	~~" (b)~~	~~2186~~	~~1~~	~~"~~	~~"~~	~~P~~	~~1944~~
23	645	Gen Purp Whse	15200	" (b)	2206	1	"	"	P	1947
24	~~649~~	~~Gen Purp Whse~~	~~1500~~	~~" (b)~~	~~3000~~	~~1~~	~~"~~	~~"~~	~~S~~	~~1947~~
25	721	Gen Purp Whse	35000	" (b)	9260	1	"	"	S	1941
26	723	Gen Purp Whse	15400	" (b)	10000	1	"	"	S	1941
27	724	Gen Purp Whse	20700	" (b)	10000	1	"	"	S	1941
28	725	Gen Purp Whse	20500	" (b)	10000	1	"	"	S	1941
29	~~647~~	~~Storage~~	~~1500~~	~~" (b)~~	~~3000~~	~~1~~	~~"~~	~~"~~	~~S~~	~~1947~~
30	~~648~~	~~Storage~~	~~1500~~	~~" (b)~~	~~3000~~	~~1~~	~~"~~	~~"~~	~~S~~	~~1947~~
31	~~639~~	~~Storehouse~~	~~1500~~	~~" (b)~~	~~984~~	~~1~~	~~"~~	~~"~~	~~T~~	~~1954~~
32	~~640~~	~~Storehouse~~	~~1500~~	~~" (b)~~	~~900~~	~~1~~	~~"~~	~~"~~	~~T~~	~~195[illegible]~~
		TOTAL								

*Prefix figures with symbols to denote type of space as follows: (a) for o[illegible] (b) [illegible]

A-7

STANDARD FORM 118a
DECEMBER 1953
PRESCRIBED BY GENERAL SERVICES ADMINISTRATION
REGULATION 2-IV-201.00

BUILDINGS, STRUCTURES, UTILITIES, AND MISCELLANEOUS FACILITIES

SCHEDULE A—SUPPLEMENT TO REPORT OF EXCESS REAL PROPERTY

1. HOLDING AGENCY NO. SJA-36

2. PAGE 4 OF 7 PAGES OF THIS SCHEDULE

GSA CONTROL NO. (GSA use only)

3. ANNUAL RENTAL

LINE NO. (a)	HOLDING AGENCY BUILDING NO. (b)	DESCRIPTION (c)	COST (d)	OUTSIDE DIMENSIONS (e)	FLOOR AREA (Sq. ft.) (f)*	NO. OF FLOORS (g)*	CLEAR HEAD-ROOM (h)*	FLOOR LOAD RANGE (i)*	RESTRICTIONS ON USE OR TRANSFER OF GOVERNMENT INTEREST Construction (j) Type	Year
1	748	Target Storage	700	NA (b)	475	1	NA	NA	T	1955
2	475	VET Facility	200	" (c)	104	1	"	"	T	1950
3	627	VET Facility	1500	" (b)	2218	1	"	"	T	1942
4	652(½)	Engr Adm Bldg	53000	" (a)	2857	1	"	"	P	1948
5	733	Ord Adm Bldg	17000	" (a)	899	1	"	"	P	1941
6	722	PH ADm Bldg	48900	" (a)	4560	1	"	"	P	1941
7	700	Adm	16700	" (a)	2475	1	"	"	P	1947
8	712	Adm	27300	" (a)	3981	1	"	"	S	1947
9	716	Adm	5500	" (a)	937	1	"	"	S	1947
10	469	Adm	800	" (a)	336	1	"	"	T	1958
11	1400	FH NCO (4 Fa.)	26300	" (c)	4324	1	"	"	P	1943
12	1401	FH NCO (6 Fa.)	30600	" (c)	4952	1	"	"	P	1943
13	1402	FH NCO (2 Fa.)	9900	" (c)	1520	1	"	"	P	1943
14	1403	FH NCO (6 Fa.)	30600	" (c)	4972	1	"	"	P	1943
15	1404	FH NCO (2 Fa.)	9900	" (c)	1520	1	"	"	P	1943
16	1405	FH NCO (6 Fa.)	30600	" (c)	4972	1	"	"	P	1943
17	1407	FH NCO (2 Fa.)	9900	" (c)	1520	1	"	"	P	1943
18	1408	FH NCO (6 Fa.)	30600	" (c)	4952	1	"	"	P	1943
19	1409	FH NCO (4 Fa.)	26300	" (c)	4324	1	"	"	P	1943
20	1410	FH NCO (6 Fa.)	30600	" (c)	4972	1	"	"	P	1943
21	1411	FH NCO (2 Fa.)	9900	" (c)	1520	1	"	"	P	1943
22	701	EM Bks w/o Mess (20 Mn)	16700	" (c)	2475	1	"	"	S	1947
23	702	EM Bks w/o Mess (20 Mn)	16400	" (c)	2475	1	"	"	S	1947
24	703	EM Bks w/o Mess (20 Mn)	16700	" (c)	2475	1	"	"	S	1947
25	704	EM Bks w/o Mess (20 Mn)	16700	" (c)	2475	1	"	"	S	1947
26	705	EM Bks w/o Mess (30 Mn)	16700	" (c)	2475	1	"	"	S	1947
27	711	EM Bks w/o Mess (20 Mn)	16700	" (c)	2475	1	"	"	S	1947
28	713	EM Bks w/o Mess (20 Mn)	16700	" (c)	2475	1	"	"	S	1947
29	718	EM Bks w/o Mess (20 Mn)	16700	" (c)	2475	1	"	"	S	1947
30	719	EM Bks w/o Mess (20 Mn)	16700	" (c)	2475	1	"	"	S	1947
31	738	EM Bks w/o Mess (20 Mn)	16700	" (c)	2475	1	"	"	S	1947
32	707	EM Mess Bldg.	24600	" (c)	3554	1	"	"	S	1947
		TOTAL								

*Prefix figures with symbols to denote type of space as follows: (a) for ...

STANDARD FORM 118a
DECEMBER 1953
PRESCRIBED BY GENERAL
SERVICES ADMINISTRATION
REGULATION 2-IV-201.00

BUILDINGS, STRUCTURES, UTILITIES, AND MISCELLANEOUS FACILITIES

SCHEDULE A—SUPPLEMENT TO REPORT OF EXCESS REAL PROPERTY

1. HOLDING AGENCY NO. SJA-36

2. PAGE 5 OF 7 PAGES OF THIS SCHEDULE

GSA CONTROL NO. (GSA use only)

3. ANNUAL RENTAL

LINE NO. (a)	HOLDING AGENCY BUILDING NO. (b)	DESCRIPTION (c)	COST (d)	OUTSIDE DIMENSIONS (e)	FLOOR AREA (Sq. ft.) (f)*	NO. OF FLOORS (g)*	CLEAR HEAD-ROOM (h)*	FLOOR LOAD RANGE (i)*	RESTRICTIONS ON USE OR TRANSFER OF GOVERNMENT INTEREST Construction (j) Type	Year
1	737	EM Mess Bldg	21800	NA (c)	3235	1	NA	NA	S	1947
2	472	Lavatory Bldg	800	" (c)	150	1	"	"	T	1943
3	664	Lavatory Bldg	18000	" (c)	900	1	"	"	T	1962
4	665	Lavatory Bldg	18000	" (c)	900	1	"	"	T	1962
5	666	Tent Frame - Fl	400	" -	-	-	"	"	P	1962
6	667	Tent Frame - Fl	400	" -	-	-	"	"	P	1962
7	668	Tent Frame - Fl	400	" -	-	-	"	"	P	1962
8	669	Tent Frame - Fl	400	" -	-	-	"	"	P	1962
9	670	Tent Frame - Fl	400	" -	-	-	"	"	P	1962
10	671	Tent Frame - Fl	400	" -	-	-	"	"	P	1962
11	672	Tent Frame - Fl	400	" -	-	-	"	"	P	1962
12	673	Tent Frame - Fl	400	" -	-	-	"	"	P	1962
13	674	Tent Frame - Fl	400	" -	-	-	"	"	P	1962
14	675	Tent Frame - Fl	400	" -	-	-	"	"	P	1962
15	676	Tent Frame - Fl	400	" -	-	-	"	"	P	1962
16	677	Tent Frame - Fl	400	" -	-	-	"	"	P	1962
17	678	Tent Frame - Fl	400	" -	-	-	"	"	P	1962
18	679	Tent Frame - Fl	400	" -	-	-	"	"	P	1962
19	680	Tent Frame - Fl	400	" -	-	-	"	"	P	1962
20	681	Tent Frame - Fl	400	" -	-	-	"	"	P	1962
21	682	Tent Frame - Fl	400	" -	-	-	"	"	P	1962
22	683	Tent Frame - Fl	400	" -	-	-	"	"	P	1962
23	684	Tent Frame - Fl	400	" -	-	-	"	"	P	1962
24	685	Tent Frame - Fl	400	" -	-	-	"	"	P	1962
25	686	Tent Frame - Fl	400	" -	-	-	"	"	P	1962
26	687	Tent Frame - Fl	400	" -	-	-	"	"	P	1962
27	688	Tent Frame - Fl	400	" -	-	-	"	"	P	1962
28	689	Tent Frame - Fl	400	" -	-	-	"	"	P	1962
29	690	Tent Frame - Fl	300	" -	-	-	"	"	P	1962
30	691	Tent Frame - Fl	300	" -	-	-	"	"	P	1962
31	692	Tent Frame - Fl	300	" -	-	-	"	"	P	1962
32	693	Tent Frame - Fl	300	" -	-	-	"	"	P	1962
		TOTAL								

*Prefix figures with symbols to denote type of space, as follows: (a) for office; (b) for storage; (c) for ...

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STANDARD FORM 118-A
DECEMBER 1951
PRESCRIBED BY GENERAL SERVICES ADMINISTRATION
REGULATION 2-IV-201.00

BUILDINGS, STRUCTURES, UTILITIES, AND MISCELLANEOUS FACILITIES

118-202

SCHEDULE A—SUPPLEMENT TO REPORT OF EXCESS REAL PROPERTY

1. HOLDING AGENCY NO. SJA-36

2. PAGE 6 OF 7 PAGES OF THIS SCHEDULE

GSA CONTROL NO. (GSA use only)

3. ANNUAL RENTAL

LINE NO. (a)	HOLDING AGENCY BUILDING NO. (b)	DESCRIPTION (c)	COST (d)	OUTSIDE DIMENSIONS (e)		FLOOR AREA (Sq. ft.) (f)*	NO. OF FLOORS (g)*	CLEAR HEAD-ROOM (h)*	FLOOR LOAD RANGE (i)*	RESTRICTIONS ON USE OR TRANSFER OF GOVERNMENT INTEREST (j) Type	Construction Year
1	694	Tent Frame - Fl	300	NA	-	-	-	NA	NA	P	1962
2	695	Tent Frame - Fl	300	"	-	-	-	"	"	P	1962
3	696	Tent Frame - Fl	300	"	-	-	-	"	"	P	1962
4	697	Tent Frame - Fl	300	"	-	-	-	"	"	P	1962
5	698	Tent Frame - Fl	300	"	-	-	-	"	"	P	1962
6	699	Tent Frame - Fl	300	"	-	-	-	"	"	P	1962
7	717	Day Room	10900	"	(b)	1662	1	"	"	S	1947
8	706	Horseback Fac	3000	"	(o)	840	1	"	"	T	1958
9	709	Basket Ball Ct	5500	"	-	-	-	"	"	P	1945
10	714	Handball Cts	5000	"	-	-	-	"	"	P	1951
11	715	Skeet Fld	800	"	-	-	-	"	"	P	1956
12	629	Subs 2000 KV	17000	"	-	-	-	"	"	P	1940
13	630	Transf Bank out	500	"	-	-	-	"	"	P	1955
14	739	Transf Bank	11400	"	-	-	-	"	"	P	1947
15	799	Transf Bank	500	"	-	-	-	"	"	P	1947
16	656	Sewage Treat Pl 525 Tg	300000	"	-	-	-	"	"	P	1949
17	658	Sewage Treat Pl 1 Tg	500	"	-	-	-	"	"	P	1949
18	462	Sep Tk Drn Fld 1 Tg out ✓	200	"	-	-	-	"	"	P	1945
19	659	Sep Tk Drn Fld 2 Tg	300	"	-	-	-	"	"	P	1945
20	708	Sep Tk Drn Fld 2 Tg	5600	"	-	-	-	"	"	P	1954
21	720	Sep Tk Drn Fld 2 Tg	200	"	-	-	-	"	"	P	1958
22	749	Sep Tk Drn Fld	2900	"	-	-	-	"	"	P	1949
23	906	Sep Tk Drn Fld 2 Tg out	200	"	-	-	-	"	"	P	1949
24	631	Swg Pmp 144 Tg out	3100	"	-	-	1	"	"	P	1955
25	660	Swg Pmp 525 Tg	2500	"	-	-	1	"	"	P	1949
26	797	Swg Pmp 1440 Tg	6100	"	-	-	1	"	"	P	1952
27	474	Incinerator	400	"	-	-	-	"	"	P	1942
28	747	Wter Trmt Pl	3900	"	-	-	1	"	"	P	1942
29	473	Wter Stor Tk out ✓	300	"	-	-	-	"	"	P	1943
30	625	Wter Trmt Pl	100	"	-	-	1	"	"	T	1945
31	617	Wter Pump P N/A Tg out ✓	3900	"	-	-	1	"	"	P	1942
32	621	Wter Pump P N/A Tg	11200	"	-	-	1	"	"	P	1942
		TOTAL									

*Prefix figures with symbols to denote type of space, as follows: (a) for office; (b) for storage; (c) for other

STANDARD FORM 118-A
DECEMBER 1953
PRESCRIBED BY GENERAL SERVICES ADMINISTRATION
REGULATION 2-IV-201.00

BUILDINGS, STRUCTURES, UTILITIES, AND MISCELLANEOUS FACILITIES

118-202

SCHEDULE A—SUPPLEMENT TO REPORT OF EXCESS REAL PROPERTY

1. HOLDING AGENCY NO. SJA-36

2. PAGE 7 OF 7 PAGES OF THIS SCHEDULE

GSA CONTROL NO. (*GSA use only*)

3. ANNUAL RENTAL

LINE NO. (a)	HOLDING AGENCY BUILDING NO. (b)	DESCRIPTION (c)	COST (d)	OUTSIDE DIMENSIONS (e)	FLOOR AREA (Sq. ft.) (f)*	NO. OF FLOORS (g)*	CLEAR HEAD-ROOM (h)*	FLOOR LOAD RANGE (i)*	RESTRICTIONS ON USE OR TRANSFER OF GOVERNMENT INTEREST (j) Type	Construction Year
1	634	Wter Pump P T/A Tg	400	NA –	–	1	NA	NA	P	1951
2	710	Wter Pump P 144 Tg	2600	" –	–	1	"	"	P	1942
3	727	Wter Pump P N/A Tg	3700	" –	–	1	"	"	P	1941
4	728	Wter Pump P N/A Tg	3100	" –	–	1	"	"	P	1941
5	735	Wter Pump P N/A Tg	2300	" –	–	1	"	"	P	1942
6	86010	Railroad Tracks (1 Mi.)	19600	" –	–	1	"	"	P	1947
7	920	Railroad Bridge ✓	3500	" –	–	1	"	"	P	1947
8	730	Sentry Station	1000	" (o)	72	1	"	"	P	1941
9	731	Sentry Station	1000	" (o)	35	1	"	"	P	1941
10	745	Sentry Station	900	" (o)	35	1	"	"	P	1941
11	626	Sentry Station	100	" (c)	31	1	"	"	T	1942
12	83210	Sanitary Sewer Sys (26720 LF)	58800	" –	–	–	"	"	P	1928
13	84210	Wter Pipelines (84485 LF)	199270	" –	–	–	"	"	P	1928
14	85110	Roads (176791 SY)	339161	" –	–	–	"	"	P	1928-64
15	85210	Veh Pkg Area (9391 SY)	39458	" –	–	–	"	"	P	1947
16	85220	Sidewalk (4312 SY)	12033	" –	–	–	"	"	P	1947
17	87110	Storm Sewer (3592 LF)	15165	" –	–	–	"	"	P	1948
18	87210	Fence or Walls (66613 LF)	228400	" –	–	–	"	"		1947
19	45110	Opn Stor Area (321175 SY)	642940	" –	–	–	"	"	P	1948
20	81230	Street Lights (8050 LF)	10300	" –	–	–	"	"	P	1947
21	81240	Elect Distr. Lines (125965 LF)	158101	" –	–	–	"	"	P	1947
22	81250	Flood -SEC-LTG (3260 LF)	4108	" –	–	–	"	"	P	1947
23	81260	Dist XFMR (980 KV)	26550	" –	–	–	"	"	P	1947
24										
25										
26										
27										
28										
29										
30										
31										
32										
		TOTAL	[illegible]9098286		752812					

*Prefix figures with symbols to denote type of space, as follows: (a) for office; (b) for storage; (c) for other

A-11

STANDARD FORM 118-B
DECEMBER 1953
PRESCRIBED BY GENERAL
SERVICES ADMINISTRATION
REGULATION 2-IV-201.00

LAND

SCHEDULE B—SUPPLEMENT TO REPORT OF EXCESS REAL PROPERTY

118-302

1. HOLDING AGENCY NO. SJA-36

2. PAGE 1 OF 1 PAGES OF THIS SCHEDULE

3. GOVERNMENT INTEREST
- [ ] LEASE
- [ ] PERMIT
- [X] FEE
- [ ] LICENSE
- [X] EASEMENT
- [ ] INFORMAL AGREEMENT

GSA CONTROL NO. (*GSA use only*)

A-12

LINE NO. (a)	TRACT NO. (b)	NAME OF FORMER OWNER OR LESSOR AND ADDRESS (c)	TRACT ACQUIRED (*Acres or sq. ft.*) (d)	EXCESS REAL PROPERTY: ACRES OR SQUARE FEET (e)	EXCESS REAL PROPERTY: COST (f)	EXCESS REAL PROPERTY: ANNUAL RENTAL (g)	TYPE OF ACQUISITION (h)	RESTRICTIONS ON USE OR TRANSFER OF GOVERNMENT INTEREST (i)
1	Unno.	Orig. Reservation	285.76	1.23	-	-	Fee Absolute	Purchase -Deed dtd 3-13-28
2	A	Dept of the Navy	264.12	242.27	-	-	" Reversion	Trfr Ltr dtd 3-10-42
3	3	Rafael Arrieta, et al	185.40	59.82	18447.00 E	-	" Absolute	D/T Civil Action #110
4	4	Rafael Cofiño Estate	53.50	53.50	8721.66	-	" "	" "
5	5	Francisco Viejo	72.20	72.20	16002.28	-	" "	" "
6	6	Mario Blanco Morales et al	194.90	188.47	55119.00 E	-	" "	Pur. Deed dtd 4-15-40
7	13	Rafael Arrieta, et al	36.88	19.68	5446.00 E	-	" "	D/T Civil Action #2206
8	14	Jose A. Lopez, et ux	8.42	8.42	2169.00	-	" "	D/T Civil Action #2206
9	15	Marcos T. Caneja	203.56	198.63	44574.00 E	-	" "	" "
10	16	Comm. of Puerto Rico	3.66	3.66	-	-	" Reversion	Pur Deed dtd 9-25-41
11	17	Celestino E. Iriarte	33.30	18.97	31422.00 E	-	" Absolute	D/T Civil Action #1860
12	18	Aparicio Espola	0.59	0.59	600.00	-	" "	" "
13	19	Marcial Alvarez	0.53	0.53	400.00	-	" "	" "
14	20	Comm. of Puerto Rico	8.97	6.47	-	-	" Reversion	Pur Deed dtd 1-18-51
15	33E	P.R. Cement Corp.	0.03	0.03	-	-	Easement	Fence Reloc. Deed dtd 8-11-50
16								
17								
18								See Exhibit No.
19								regarding decontamination
20								
21								See letter of transmittal.
22								
23								See Report of Title for
24								existing outgrants
25					E = Estimated			
26								
27								
28								
29								
30								
31								
32								
		TOTAL	1351.82	874.47	182600.94	-		

Supplemental Agreement No. 8
Department of the Army
Lease No. DACA 17-1-69-3011

WHEREAS, the Secretary of the Army, by virtue of the authority conferred upon him by law, and for the consideration of one hundred four thousand five hundred dollars ($104,500.00) per annum, payable monthly in advance, leased to the Commonwealth of Puerto Rico, hereinafter designated as the Lessee, by Lease DACA 17-1-69-3011, for a term of one (1) year, beginning 6 December 1968, and ending 5 December 1969, but revocable at will by the Secretary of the Army, or the officer of the Government having jurisdiction over the property, certain lands, buildings and other improvements at Fort Buchanan Military Reservation, Puerto Rico, all of which demised premises are more particularly described in the said lease; and

WHEREAS, by Supplemental Agreement No. 1, dated 13 March 1970, the term of the said lease was extended one (1) year to 5 December 1970; and

WHEREAS, by Supplemental Agreement No. 2, dated 22 March 1972, the demised premises where expanded, effective as the original date of the lease, to include certain other land areas, as more particularly described in the said Supplemental Agreement, and the term of the said lease was further extended to 5 December 1972; and

WHEREAS, by Supplemental Agreement No. 3, dated 11 September 1973, the term of the said lease was further extended to 5 December 1973; and

WHEREAS, by Supplemental Agreement No. 4, dated 21 November 1978, the term of the said lease was further extended to 5 December 1977 and the rental consideration changed to read Seventy Thousand Dollars ($70,000) per annum; and

WHEREAS, by Supplemental Agreement No. 5, dated 21 November 1978, the term of said lease was further extended from 6 December 1977 through 5 December 1979, all inclusive, and provided therein for a rental consideration of any earned profit by the Lessee which is over and above the cost of protection and maintenance for the leased premises; and

WHEREAS, by supplemental Agreement No. 6, dated 31 July 1980, and Supplemental Agreement No. 7, dated 29 July 1981, the term of said lease was further extended to through 5 December 1981; and

WHEREAS, the Commonwealth is currently litigating with the U.S. Government regarding certain reverter clauses contained in the original deeds of acquisition and its effect on the disposition of the Government-owned improvements on the lands; and

WHEREAS, it is mutually desired to extend the term of said lease for another one (1) year period through 5 December 1982.

NOW, THEREFORE, effective 6 December 1981, Department of the Army Lease DACA 17-1-69-3011, as amended, is further amended as follows:

1. This lease extension is executed for the purpose of continuing the terms of the Army Lease DACA 17-1-69-3011 and as such its terms and/or conditions shall not affect the merits of the litigation.

2. The term of the said lease, extended, is hereby further extended to 5 December 1982, but revocable at will by the Secretary of the Army, or the officer of the Government having jurisdiction over the property.

Except as herein provided, all other terms and condition of said lease shall remain unchanged.

IN WITNESS WHEREOF, I have hereunto set my hand by direction of the Assistant Secretary of the Army this 3 day of November 1981.

ADOLFO MORENO-ESPAÑOL
Chief, Real Estate Section
San Juan Area Office
Jacksonville, Florida District
U.S. Army Corps of Engineers

This supplemental agreement is hereby accepted by the Lessee this day 30 of Octob. 1981.

COMMONWEALTH OF PUERTO RICO

Signature

John A. Falcón, Executive Director (Acti
Puerto Rico Ports Authority

DEPARTMENT OF THE ARMY

LEASE

OF PROPERTY ON FORT BUCHANAN (PUERTO RICO) MILITARY RESERVATION

No. DACA17-1-69-3011

THIS LEASE, made between the Secretary of the Army, of the first part and
COMMONWEALTH OF PUERTO RICO
of the second part, WITNESSETH:

That the Secretary of the Army, by virtue of the authority conferred upon him by Law ~~contained in Title 10, United States Code, Section 2667~~ *and for the consideration hereinafter set forth, hereby leases to the party of the second part, hereinafter designated as the lessee, for a term of* One (1) Year, *beginning* 6 December, *19* 68, *and ending* 5 December, *19* 69, *but revocable at will by the Secretary of the Army,* ~~*the*~~ *following described property for* commercial purposes:

A. LAND: ~~Irregular shaped parcel approximately 25.58 acres, extending from~~ near ~~Insular Highway 2 to the Bay of San Juan.~~ The parcel is made up of parts of three tracts, known as Tracts 16, 17 and 20 of the Fort Buchanan Military Reservation, totalling 29.10 acres, reduced by 2.02 acres by the Right-of-Way for De Diego Expressway and 1.50 acres for El Cano Avenue Right-of-Way, leaving for lease approximately 25.58 acres. The area is as outlined in red on Sketch marked "Fort Buchanan, Puerto Rico, General Site Map", dated 1 June 1962, Sheet 13 of 70, attached hereto and made a part hereof as Exhibit "A".

B. IMPROVEMENTS: A berth pier and two-story covered warehouse extending into San Juan Bay (#619 and #620). Water pump house (#621); Gasoline Station (#637); Maintenance Shop (#646); two small warehouses (#642 and #645); a quonset type structure and other miscellaneous structures, including a small wharf. The improvements are more particularly described in the Inventory and Condition Report, mentioned in Paragraph 2 hereof, marked Exhibit "B" hereto.

* or the officer of the Government having jurisdiction over the property (also applicable to * in Clause 20 (FIRST), hereinbelow)

[illegible]

DA FORM 1367 1 JAN 64 REPLACES EDITION OF 1 DEC 62, WHICH IS OBSOLETE (ER 405-1-350)

THIS LEASE is granted subject to the following conditions:

1\. *That the lessee shall pay to the United States rental in the amount of* ONE HUNDRED FOUR THOUSAND FIVE HUNDRED DOLLARS – ($104,500.00 – – – –) *per annum, payable* monthly – – – – – – – – *in advance, and the lessee shall also pay to the United States on demand any sum which may have to be expended after the expiration, revocation, or termination of this lease in restoring the premises to the condition required by Condition No. 20 hereof. Compensation shall be made payable to the Treasurer of the United States and forwarded by the lessee direct to* Finance Officer, U. S. Army Engineers, Jacksonville, P. O. Box 4970, Jacksonville, Florida 32201

2\. *That, as of the commencement date of this lease, an inventory and condition report of all personal property and improvements of the Government included in this lease shall be made by a representative of the Government and a representative of the lessee to reflect the then present condition of said property. A copy of said inventory and condition report shall be attached hereto and become a part hereof, as fully as if originally incorporated herein. At the expiration, revocation, or termination of this lease a similar inventory and condition report shall be prepared and submitted to the* – – Area *Engineer,* San Juan Area Office, Puerto Rico – – – – – – – – – – *hereinafter designated as "said officer," said inventory and condition report to constitute the basis for settlement by the lessee with said officer for leased property shown to be lost, damaged, or destroyed, any such property to be either replaced or restored to the condition required by Condition No. 20 hereof, or at the election of the Government reimbursement made therefor by the lessee at the then current market value thereof.*

3\. *That the lessee has inspected and knows the condition of the leased property, and it is understood that the same is hereby leased without any representation or warranty by the Government whatsoever, and without obligation on the part of the Government to make any alterations, repairs, or additions thereto.*

4\. *That, subject to the limitations of Condition No. 20 hereof with respect to the restoration of the property, all portions of the leased property shall at all times be protected and maintained in good order and condition by and at the expense of the lessee.*

5\. *That the lessee shall neither transfer nor assign this lease or any property on the demised premises, nor sublet the demised premises or any part thereof or any property thereon, nor grant any interest, privilege, or license whatsoever in connection with this lease without permission in writing from the said officer.*

6\. *That the right is hereby reserved to the United States, its officers, agents, and employees to enter upon the said premises at any time for the purpose of inspection and inventory and when otherwise deemed necessary for the protection of the interests of the Government, and the lessee shall have no claim of any character on account thereof against the United States or any officer, agent, or employee thereof.*

7\. *That the United States shall not be responsible for damages to property or injuries to persons which may arise from or be incident to the use and occupation of the said premises, or for damages to the property of the lessee, or for injuries to the person of the lessee (if an individual), or for damages to the property or injuries to the person of the lessee's officers, agents, servants, or employees, or others who may be on said premises at their invitation or the invitation of any one of them, arising from governmental activities, and the lessee shall hold the United States harmless from any and all such claims.*

8\. *That the lessee shall at all times exercise due diligence in the protection of the demised premises against damage or destruction by fire and other causes.*

9\. *That any property of the United States damaged or destroyed by the lessee incident to the lessee's use and occupation of the said property shall be promptly repaired or replaced by the lessee to the satisfaction of the said officer, or in lieu of such repair or replacement the lessee shall, if so required by the said officer, pay to the United States money in an amount sufficient to compensate for the loss sustained by the United States by reason of damages to or destruction of Government property.*

10\. *That the lessee shall cut no timber, conduct no mining or drilling operations, remove no sand, gravel, or kindred substances from the ground, except in the exercise of mineral rights heretofore reserved to the record owner thereof, commit no waste of any kind, or in any manner substantially change the contour or condition of the property hereby leased, except changes required in carrying out soil and water conservation measures.*

11. That the less[illegible] will comply with all applicable laws, [illegible]ances, and regulations of the State, county, and municipality wherein the said demised premises are located, with regard to construction, sanitation, licenses or permits to do business, and all other matters.

12. That the lessee shall not construct any permanent structure on the said demised premises, and shall not construct any temporary structure or advertising sign thereon without the prior written consent of the said officer.

13. That the lessee shall pay to the proper authority, when and as the same becomes due and payable, all taxes, assessments, and similar charges, which at any time during the term of this lease, may be taxed, assessed or imposed upon the Government or upon the lessee with respect to or upon the leased premises. In the event any taxes, assessments, or similar charges are imposed with the consent of the Congress upon property owned by the Government and included in this lease (as opposed to the leasehold interest of the lessee therein), this lease shall be renegotiated so as to accomplish an equitable reduction in the rental provided above, which shall not be greater than the difference between the amount of such taxes, assessments, or similar charges and the amount of any taxes, assessments or similar charges which were imposed upon such lessee with respect to his leasehold interest in the premises prior to the granting of such consent by the Congress; provided that in the event that the parties thereto are unable to agree within 90 days from the date of the imposition of such taxes, assessments, or similar charges, on a rental which in the opinion of the said officer, constitutes a reasonable return to the Government on the leased property, then in such event, the said officer shall have the right to determine the amount of the rental, which determination shall be binding on the lessee subject to appeal in accordance with Condition No. 14 of this lease.

14. (a) That, except as otherwise provided in this lease, any dispute concerning a question of fact arising under this lease which is not disposed of by agreement shall be decided by the said officer, who shall reduce his decision to writing and mail or otherwise furnish a copy thereof to the Lessee. The decision of the said officer shall be final and conclusive unless, within 30 days from the date of receipt of such copy, the Lessee mails or otherwise furnishes to the said officer a written appeal addressed to the Secretary of the Army. The decision of the Secretary or his duly authorized representative for the determination of such appeals shall be final and conclusive unless determined by a court of competent jurisdiction to have been fraudulent, or capricious, or arbitrary, or so grossly erroneous as necessarily to imply bad faith, or not supported by substantial evidence. In connection with any appeal proceeding under this condition, the Lessee shall be afforded an opportunity to be heard and to offer evidence in support of its appeal. Pending final decision of a dispute hereunder, the Lessee shall proceed diligently with the performance of the contract and in accordance with the said officer's decision.

(b) This Condition does not preclude consideration of law questions in connection with decisions provided for in paragraph (a) above: Provided, that nothing in this Condition shall be construed as making final the decision of any administrative official, representative, or board on a question of law.

15. That this lease may be terminated by the lessee at any time by giving to the Secretary of the Army, through the said officer, at least ten (10) days' notice thereof in writing, provided that, in case of such termination, no refund by the United States of any rental theretofore paid shall be made, and provided further, that in the event the said notice is not given at least ten (10) days prior to the rental due date, the lessee shall be required to pay the rental for the period or term shown in Condition No. 3 hereof.

16. That the use and occupation of the premises leased hereby shall be subject to the general supervision and approval of the officer having immediate jurisdiction over the property and to such rules and regulations as may be prescribed by him from time to time.

17. That the lessee shall pay the cost, as determined by the officer having immediate jurisdiction over the property, of producing and/or supplying any utilities and other services furnished by the Government or through Government-owned facilities for the use of the lessee, including the lessee's proportionate share of the cost of operation and maintenance of the Government-owned facilities by which such utilities or services are produced or supplied. The Government shall be under no obligation to furnish utilities or services. Payment shall be made in the method prescribed by the officer having immediate jurisdiction over the property, upon bills rendered monthly.

18. That for such per[illegible] as the lessee is in possession of the le[illegible] property pursuant to the provisions and conditions of this lease the lessee shall procure and maintain at its cost a standard fire and extended coverage insurance policy or policies on the leased property to the full insurable value thereof. The lessee shall procure such insurance from any responsible company or companies, and furnish either the original policy or policies or certificate of insurance or certificates of insurance to the District Engineer. The policy or policies evidencing such insurance shall provide that in the event of loss thereunder the proceeds of the policy or policies, at the election of the Government, shall be payable to the lessee to be used solely for the repair, restoration or replacement of the property damaged or destroyed, any balance of the proceeds not required for the repair, restoration, or replacement of the property damaged or destroyed to be paid to the Government, and that in the event the Government does not elect by notice in writing to the insurer within 60 days after the damage or destruction occurs to have the proceeds paid to the lessee for the purposes hereinabove set forth, then such proceeds shall be paid to the Government, provided, however, that the insurer, after payment of any proceeds to the lessee in accordance with the provisions of the policy or policies shall have no obligation or liability with respect to the use or disposition of the proceeds by the lessee. Nothing herein contained shall be construed as an obligation upon the Government to repair, restore, or replace the leased property, or any part thereof.

19. That no Member of or Delegate to Congress or Resident Commissioner shall be admitted to any share or part of this lease or to any benefit to arise therefrom. Nothing, however, herein contained shall be construed to extend to any incorporated company, if the lease be for the general benefit of such corporation or company.

20. That, on or before the date of expiration of this lease or its termination by the lessee, the lessee shall at its cost vacate the leased property, remove the property of the lessee therefrom, and restore the leased property to as good order and condition as that existing upon the date of commencement of the term of this lease, less ordinary wear and tear and damage to the leased property covered by insurance and for which the Government shall receive or has received insurance funds in lieu of having the damaged property repaired, replaced, or restored. If, however, this lease is revoked, the lessee shall vacate the leased property, remove the property of the lessee therefrom, and restore the leased property to the condition aforesaid within such time as the Secretary of the Army* may designate. In either event, if the lessee shall fail or neglect to remove the property of the lessee and so restore the leased property, then, at the option of the Secretary of the Army* the property of the lessee shall either become the property of the United States without compensation therefor, or the Secretary of the Army* may cause it to be removed and the leased property to be so restored at the expense of the lessee, and no claim for damages against the United States or its officers or agents shall be created by or made on account of such removal and restoration work.

20 (ALTERNATE). That, on or before the date of expiration of this lease or its termination by the lessee, the lessee shall vacate the demised premises, remove the property of the lessee therefrom, and restore the premises to as good order and condition as that existing upon the date of commencement of the term of this lease, damages beyond the control of the lessee and due to fair wear and tear excepted. If, however, this lease is revoked, the lessee shall vacate the premises, remove said property therefrom, and restore the premises to the condition aforesaid within such time as the Secretary of the Army may designate. In either event, if the lessee shall fail or neglect to remove said property and so restore the premises, then, at the option of the Secretary of the Army, said property shall either become the property of the United States without compensation therefor, or the Secretary of the Army may cause it to be removed and the premises to be restored at the expense of the lessee, and no claim for damages against the United States or its officers or agents shall be created by or made on account of such removal and restoration work.

21. That if more than one lessee is named in this lease the obligations of said lessees herein contained shall be joint and several obligations.

22. That, except as otherwise specifically provided, any reference herein to "Division Engineer", "District Engineer" or "said officer" shall include his duly appointed successors and his authorized representatives.

23. That all notices (e given pursuant to this lease shall b(lressed, if to the lessee to

Puerto Rico Ports Authority
P.O. Box 3508
San Juan, P.R. 00904

; if to the Government to the

San Juan Area Engineer
U.S. Army Engineer District, Jacksonville
P.O. Box 3829
San Juan, P.R. 00904

or as may from time to time otherwise be directed by the parties. Notice shall be deemed to have been duly given if and when inclosed in a properly sealed envelope, or wrapper, addressed as aforesaid and deposited postage prepaid (or, if mailed by the Government, deposited under its franking privilege) in a post office or branch post office regularly maintained by the United States Government.

24. The lessee warrants that no person or selling agency has been employed or retained to solicit or secure this lease upon an agreement or understanding for a commission, percentage, brokerage, or contingent fee, excepting bona fide employees or bona fide established commercial or selling agencies maintained by the lessee for the purpose of securing business. For breach or violation of this warranty the Government shall have the right to annul this lease without liability or in its discretion to require the lessee to pay, in addition to the lease rental or consideration, the full amount of such commission, percentage, brokerage, or contingent fee.

25. That in the event the United States revokes this lease or in any other manner materially reduces the area covered thereby prior to the date of expiration thereof, an equitable adjustment in the rental paid or thereafter to be paid under this lease shall be made: Provided, however, that this provision shall not apply in the event of revocation because of a breach by the lessee of any of the terms and conditions of this lease.

26. That the lessee is authorized to sub-lease the premises.

27. That this lease is subject to existing grants, shown on said Exhibit "A", such as:

01-3-71-3013

a. License DACA 17-3-69-3003 to Commonwealth of Puerto Rico for road-way through Army Terminal Area, and any renewal thereof (colored yellow).

01-1-71-3017

b. Lease DACA 17-1-69-3007 to Caribbean Gulf Refining Company for a mooring bollard, and any renewal thereof (colored green).

c. Easement DA(s)08-123 ENG 228, to Caribbean Gulf Refining Company, for oil pipeline (colored brown).

(Contd. on attached sheet)

That prior to execution of this lease conditions were deleted, revised and added in the following manner:

DELETIONS: The words in granting clause "contained in Title 10, United States Code, Section 2667". Clauses 5 and 20 alternate.

ADDITIONS: The words in granting clause "conferred upon him by law". The phrase "or the officer of the Government having jurisdiction over the property" at the places marked with x.

This lease is not subject to Title 10, United States Code, Section 2662.

IN WITNESS WHEREOF I have hereunto set my hand by direction of the Assistant Secretary of the Army this 4 day of December, 1969.

Ellery B. Myers
Chief, Real Property
Division, OASA(I&L)

THIS LEASE is also executed by the lessee this 3 day of JUNE, 1969.

COMMONWEALTH OF PUERTO RICO

By: ____________________ (SEAL)
César S. Canals, Executive Director
Puerto Rico Ports Authority
Box 3508, San Juan, Puerto Rico 00904
(Post Office Address)

Signed and sealed in the presence of:

P.O. Box 3829
San Juan, P.R. 00904

6

27. .... (Contd.)

d. Easement DA-08-123 ENG 3031, to Compañia Petrolera Chevron, Inc., for oil pipelines (colored brown).

e. Easement DA-08-123 ENG 5758 to Puerto Rico Water Resources Authority for an intake tunnel (circled in red).

f. Easement 142-3 to Puerto Rico Aqueduct & Sewer Authority for a water line (colored purple).

g. Easement DA-08-123 ENG 3010 to Puerto Rico Aqueduct & Sewer Authority for a sewer pipeline (colored orange).

5323 PRWRA
3-13-CG

APPENDIX B

USAR CENTER

SECTION X

RESERVE COMPONENTS FACILITIES UTILIZATION

	Name of Center	Location	Units Assigned	Authorized Strength	Assigned Strength	Type Facility	Acreage	%Utilization
1.		Aguadilla	B. Co 35 SIG BN	172	111	25 men	3.62	688
2.		Yauco	A Co. 35 SIG BN	172	132	25 men	3.20	688
3.	Ft. Buchanan USARC	Buchanan	DEP 1A CDR	4	3	1400 men	14	124
			HHC 166 SPT GP	95	106			
			HHC 448 ENGR BN	109	100			
			Co. A 448 ENGR BN	142	136			
			Co. B 448 ENGR BN	174	174			
			430 FSC	115	122			
			2979th USAR SCA	89	57			
			338th FIN SEC	71	75			
			369th STA HOSP.	206	202			
			305 CHEM DET	40	3			
			407th MED AMB CO.	95	98			
			429 PSC	116	118			
			2d MTC-PR DET	35	40			

RESERVE COMPONENTS FACILITIES UTILIZATION

Name of Center	Location	Units Assigned	Authorized Strength	Assigned Strength	Type Facility	Acreage	%Utilization
		597 SUP CO.	255	270			
4. Punta Borinquen	Ramey	Vacant	0	0	Not Rated	52	
5. Roosevelt Roads	Ceiba	390 TT CO.	252	118	Not Rated	6	
		699 ENGR CO.	207	182			
6.	Ponce	C Co. 448 ENGR CO.	174	178	100	5.19	174
7.	Pto Nuevo	831st SIG CO.	279	221			
		807th CABLE	245	234	400	20.56	131
8.	Ramey	820 Sta. Hosp.	206	192	600	5.24	108
		266 ORD CO.	173	170			
		491 GS CO.	214	215			
		311	53	49			
9.	Bayamon	HHD 346 TC BN	46	48	300	6.80	139
		268 TC CO.	57	56			
		432nd TC CO.	150	129			
		301st MP CO.	164	193			
	Salinas	264th C&C CO.	100	111	25	3.15	400

RESERVE COMPONENTS FACILITIES UTILIZATION

	Name of Center	Location	Units Assigned	Authorized Strength	Assigned Strength	Type Facility	Acreage	%Utilization
11.		Caguas	D Co. 448 ENGR BN.	174	201	100	3.02	174
12.	Fort Allen	Ponce	HHC 35 SIG BN	157	67	Not Rated		
			276 FH MAINT CO.	203	71			
			941	181	114			
			350 MED DET.	19	33			

APPENDIX C

WATER QUALITY CRITERIA

Sewage—See municipal wastes.

Solid wastes—All refuse including, but not limited to, garbage, rubbish, incinerator residue, street sweepings, dead animals, and animal wastes.

Source—Any discharge from a property, real or personal, which generates or may generate any water pollutant.

Surface waters—Any natural or artificial water source including all streams, lakes, ponds, impounding reservoirs, inland watercourses and waterways, springs, irrigation systems, drainage systems and all other inland water bodies or accumulated waters. For the purpose of this Regulation the term does not include coastal waters or those subject to the ebb and flow of tides.

Thermocline—That layer in a body of water where the temperature difference is greatest per unit depth. It is the layer in which the temperature gradient equals or exceeds 1 °C per meter.

Water pollutant—See Pollutant.

Water pollution control facilities or equipment—Any process, equipment, device, and all appurtenances thereto, used for eliminating, reducing, or controlling the discharge of any water pollutant.

Water Quality Standards—The designated water body uses or classifications, the criteria to protect those uses, and the antidegradation statement.

Waters, Waters of Puerto Rico—Coastal or surface waters of Puerto Rico.

Wastewater—See Municipal wastes.

Wastewater treatment facilities—See Water pollution control equipment or facilities.

ARTICLE 2—WATER QUALITY STANDARDS AND USE CLASSIFICATIONS FOR THE WATERS OF PUERTO RICO

Pursuant to the intent of these Regulations, the following water quality standards are promulgated for the coastal and surface waters of the Commonwealth of Puerto Rico.

The following water quality standards shall apply at all times, except for surface waters during periods when their flows are less than the average minimum seven-day low flow which occurs once in any ten years.

2.1 General water quality standards

All waters meet generally accepted aesthetic qualifications and shall be capable of supporting diversified aquatic life. These waters shall, except as specifically noted, meet the following quality standards:

2.1.1 Solids and other matter

The waters of Puerto Rico shall not contain materials attributable to discharges that will settle to form objectionable deposits. Nor will they contain floating, debris, scum, oil and other floating materials attributable to discharges in amounts sufficient to be unsightly or deleterious.

2.1.2 Color, odor, taste or turbidity

The waters of Puerto Rico shall be free from color, odor, taste or tubidity attributable to discharges in such a degree as to create a nuisance.

2.1.3 Substances in toxic concentration or combinations thereof

The waters of Puerto Rico shall not contain substances in concentrations or combinations which are toxic or which produce undesirable physiological responses in human, fish or other animal life, and plants.

2.1.3 (A) Specific standards for some substances: The maximum allowable concentration of certain substances in the receiving coastal and/or surface waters shall be the following.

SUBSTANCE	COASTAL WATERS Limit (mg/l)	SURFACE WATERS Limit (mg/l)
Arsenic (As)	0.15	0.050
Barium (BA)	1.0	1.0
Boron (B)	4.8	1.0
Cadmium (Cd)	0.005	0.005
Carbon (Chloroform extract)	28.0	0.15
Chlorides (Cl)	—	250.0
Chromium (Cr) (hexavalent)	0.05	0.05
Chromium (Cr) (trivalent)	0.30	0.05
Copper (Cu)	0.05	0.04
Cyanide (CN)	0.01	0.20
Detergents (Methylene blue) active substances)	0.5	0.100
Fluorides (F)	1.3	—
Iron (Fe)	0.200	—
Lead (Pb)	0.015	0.05
Manganese (Mn)	0.100	—
Mercury (Hg)	0.001	0.001
Nitrogen (NO_3, NO_2, NH_3)	5.0	—
Nitrate plus Nitrite (as N)	—	10.0
Phenols	0.010	0.001
Selenium (Se)	0.01	0.01
Silver (Ag)	0.001	0.001
Sulfate (SO_4)	2800.	250.
Uranil (UO_2)	0.500	0.500
Zinc (Zn)	0.050	0.050

2.1.3(b) Specific standards for pesticides

1. Organochlorides:

Organochloride pesticide residues in surface and coastal waters shall not exceed 1/100 of the TLm 96 hours of approved species. In no case shall these pesticides exceed the concentration (micrograms per liter or ppb) listed:

SUBSTANCE	CONCENTRATION
Aldrin-Dieldrin	0.002
Chlordane	0.004
DDT	0.001
Endosulfan	0.001
Endrin	0.001
Heptachlor	0.001
Lindane	0.004
Methoxychlor	0.020

Mirex	0.001
Toxaphene	0.005
Perthane	0.070

2. Organophosphorus and non-persistent pesticides: Organophosphorus and non-persistent pesticides residues in surface and coastal waters shall not exceed 1/10 of the TLm 96-hours approved species. In no case shall the following pesticides exceed the concentration (micrograms per liter por ppb) listed:

SUBSTANCE	CONCENTRATION
Demeton	0.100
Guthion	0.010
Malathion	0.100
Parathion	0.004
Coumaphos	0.010
Dursban	0.040
Fenthion	0.400
Naled	0.400
2,4-d	80.000
2,4,5-TP (Silvex)	10.000

2.1.3(C) Standards for combinations of toxic materials: When two or more toxic materials are or may be present at the same time in a body of water, the applicable water quality standards for these materials shall take into account the chronic effect of such combinations and shall be determined by means of bioassay or any other applicable method approved by the Board.

2.1.3(C)(1) When the allowable concentration for combination of toxic materials is determined by bioassay and the presence of toxic substances is caused by only one discharge, the applicable water quality standard in the boundary of the Initial Mixing Zone for any of the toxic substances will be 1/z of the concentration of that substance multiplied by the dilution factor resulting from bioassay with the said discharge, i.e.:

$$Cc = 1/z \times Cd \times (\text{TLm 96 hours or more})$$

where:

Cc = applicable water quality standard in the body of water for any of the toxic substance present in the discharge.

Cd = concentration of the toxic substance in the discharge.

z = will equal 10 for non-persistant toxicants, and will equal 100 for persistent toxicants or substances which tend to acculate in the biological food chain.

2.1.3(C)(2) When the presence of toxic substances is caused by more than one discharge, and to these discharges cannot be assigned a single Initial Mixing Zone nor separate Initial Mixing Zones without overlapping, the allowable concentration for any toxic substance in that body of water shall be determined by the Board on a case-by-case basis, in accordance with the intent expressed in this Sub-Section 2.1.3(C) and upon request of the persons responsible for the discharges.

2.1.4 Radioactive materials

The concentration of Radium-226 and Strontium-90 shall not exceed 3 and 10 picocuries per liter, respectively. In the absence of Strontium-90 and alpha emitters the gross beta concentrations shall not exceed 1,000 picocuries per liter.

2.1.5 Temperature

A. No heat may be added to the waters of Puerto Rico which would cause the monthly arithmetic mean of the maximum daily temperature at any site, prior to the addition of any heat, to be exceeded by more than 1.5°F, or which would cause the temperature at any site to exceed 94°F.

B. No discharge or combination of discharges into the waters of Puerto Rico shall be injurious to fish or shellfish or the culture or propagation of a balanced indigenous population thereof (nor in any way affect desired use).

C. Thermal discharges shall be confined to the epilimnetic layer of stratified lakes.

D. The rate of temperature change shall not be more than 1°F per hour and shall not exceed a total of 5°F in any 24 hour period except when due to natural causes.

2.1.6 Suspended, colloidal or settleable solids

Solids from wastewater sources shall not cause disposition in, or be deleterious to, the designated use of the waters.

2.2 Use classifications

2.2.1 Class SA

A. Usages and/or description:

Coastal waters whose existing characteristics should not be altered in order to preserve the existing natural phenomena. Toward that end these waters are not intended to be used for any activity, such as swimming, boating and skiing, that might be detrimental to the existing natural phenomena.

B. Standards:

1) Dissolved oxygen

Shall contain not less than 5 milligrams per liter (mg/1) except when due to natural causes.

2) Coliforms

The fecal coliform geometric average of a series of representative samples (at least five samples) of the waters taken over a period of a month shall not exceed 70 colonies per 100 milliliters (70/100 ml), and not more than 20 percent of the samples shall exceed 200 colonies/100 ml.

3) pH

Shall always lie between 7.3 and 8.5 except when natural causes alter such limits.

4) Color

Shall not be altered except by natural causes.

5) Turbidity

Shall not be altered except by natural causes. A Secchi disc shall be visible at a minimum depth of 1 meter.

6) Total Dissolved Solids

Shall not be altered except by natural causes.

7) Chlorides

(Not applicable.)

8) Taste and odor-producing substances

Shall contain none in amounts that will interfere with the preservation or enjoyment of existing natural phenomena.

9) Nutrients

Shall not be altered except by natural causes. Phosphorus as total P shall not exceed 25 ppb.

2.2.2 Class SB

A. Usages and/or description:

Coastal waters intended for uses where the human body may come in direct contact with the water (such as complete body submergence); and for use in propagation and preservation of desirable species.

B. Standards:

1) Dissolved oxygen

Shall contain not less than 5 mg/1 except when natural phenomena cause this value to be depressed.

2) Coliforms

i. The fecal coliform monthly geometric average of a series of representative samples (at least five samples) of the waters taken over a period of a month shall not exceed 200 colonies/100 ml, and not more than 20 percent of the samples exceed 400 colonies/100 ml.

ii. In shellfish-growing areas the total coliform monthly geometric average of a series of representative samples (at least five samples) of the waters taken over a period a month shall not exceed 70 colonies/100 ml, and not more than 20 percent of the samples exceed 230 colonies/100 ml.

3) pH

Shall always lie between 7.3 and 8.5 except when natural phenomena cause the value of the pH to fall outside this range. No materials that extend normal ranges of pH at any location by more than 0.1 pH should be introduced into salt water portions of tidal tributaries or coastal waters. At no time should the introduction of foreign materials cause the pH to be less than 7.3 nor greater than 8.5.

4) Color

Shall not be altered by other than natural phenomena except when it can be proven that such change in color is harmless to biota and aesthetically acceptable.

5) Turbidity

A Secchi disc shall be visible at a minimum depth of 1 meter.

6) Total dissolved solids

(Not applicable.)

7) Chlorides

(Not applicable.)

8) Taste and odor-producing substances

Shall contain none in amounts that will interfere with use for primary contact recreation or will render any undesirable taste or odor or aquatic life.

9) Nutrients

(Note: The maximum allowable limits of phosphorus and other nutrients shall be established by the Board as soon as adequate technical information about their concentrations in the waters of the Commonwealth of Puerto Rico becomes available).

2.2.3 Class SC

A. Usages and/or description:

Coastal waters intended for uses where the human body may come in indirect contact with the water (such as fishing, boating, etc.), and for use in propagation and maintenance of desirable species.

B. Standards:

1) Dissolved oxygen

Shall contain not less than 4 mg/1 except when natural conditions cause this value to be depressed.

2) Coliforms

The coliform geometric average of a series of representative samples (at least five samples) of the waters taken over a period of a month shall not exceed 10,000 colonies/100 ml total coliform or 2,000 colonies/100 ml fecal coliform. Not more than 20 percent of the samples shall exceed 4,000 colonies/100 ml fecal coliform.

3) pH

Shall always lie between 7.3 and 8.5 except when natural phenomena cause the value of the pH to fall outside this range. No materials that extend normal ranges of pH at any location by more than 0.1 pH should be introduced into salt water portions of tidal tributaries or coastal waters. At no time should the introduction of foreign materials cause the pH to be less than 7.3 nor greater than 8.5.

4) Color

Shall not be altered by other than natural phenomena except when it can be proven that such change in color is harmless to biota and aesthetically acceptable.

5) Turbidity

A Secchi disc shall be visible at a minimum depth of 1 meter.

6) Total dissolved solids

(Not applicable.)

7) Chlorides

(Not applicable.)

8) Taste and odor-producing substances

Shall contain none in amounts that will render any undesirable taste or odor to edible aquatic life.

9) Nutrients

(Note: The maximum allowable limits of phosphorus and other nutrients shall be established by the Board as soon as adequate technical information about their concentrations in the waters of the Commonwealth of Puerto Rico becomes available).

2.2.4 Class SD

A. Usages and/or description:

Surface waters intended for use as a raw water source for public water supply, and in propagation and preservation of desirable species. These waters can not be safely used for primary or secondary contact recreation, unless they comply with Section 2.2.4 B. 10.

B. Standards:

1) Dissolved oxygen

Shall contain not less that 5.0 mg/1 except during not more than 4 hours within any 24 hour period when it can contain no less than 4.0 mg/1, except when natural conditions cause this value to be depressed.

2) Coliforms

The coliform geometric average of a series of representative samples (at least five samples) of the waters taken over a period of a month shall not exceed 10,000 colonies/100 ml total coliform or 2,000 colonies/100 ml fecal coliform. Not more than 20 percent of the samples shall exceed 4,000 colonies/100 ml of fecal coliform.

3) pH

Shall always lie between 6.0 and 9.0 except when natural phenomena cause the value of the pH to fall outside this range.

4) Color

Shall not exceed 10 units according to the colorimetric platinum-cobalt standard.

5) Turbidity

Shall not exceed 50 Jackson turbidity units (JTU) except when due to natural phenomena.

6) Total dissolved solids

Shall not exceed 500 mg/1.

7) Chlorides

The monthly arithmetic average shall not exceed 250 mg/1.

8) Taste and odor-producing substances

None in amounts that will interfere with the use for potable water supply, or will render any undesirable taste or odor to edible aquatic life.

9) Nutrients

Nutrients are to be regulated in order to control eutrophication in the lakes and reservoirs of the Commonwealth of P.R. Therefore, the value of 25 ppb of Phosphorus as Total P is established as the criterion to achieve that stated purpose. Notwithstanding, the Board recognizes that the absence of adequate control technology may interfere with the attainment of said objective. In this case, the Board shall determine the minimum degree of treatment necessary to satisfy the intent of this sub-section in a case-by-case basis. The Board also acknowledges that the expressed criterion may be too restrictive or inappropriate in certain situations. Therefore, exception may be granted if demonstrated to the satisfaction of the Board that nutrients limitation is not required in a given situation.

10) Other pathogenic organisms

These waters shall be free, as certified as the Secretary of Health of the Commonwealth of Puerto Rico, from infective forms of *Schistosoma mansoni*.

ARTICLE 3—CLASSIFICATION OF THE WATERS OF PUERTO RICO ACCORDING TO THEIR INTENDED USE

3.1 Coastal waters

3.1.1 Class SA

Shall include bioluminiscent lakes and bays such as La Parguera and Monsio José on the Southern Coast. Bahia de Mosquito in Vieques, and those special areas which may be designated by the Board.

Article 2.2.1 B will apply to the waters 500 meters seaward of the physical and geographical limits of the bodies of water under this classification.

3.1.2 Class SB

This classification will apply from the zone subject to the ebb and flow of tides (mean sea level) until 500 meters seaward from the said zone. Beyond this limit, the next less restrictive classification will apply to a maximum of three (3) miles.

1. From Bahia Parguera to Punta Guanajibo in Mayaguez.
2. From Punta Algarrobo in Mayaguez to Punta Boquerón in Aguadilla.
3. From Punta Borinquen in Aguadilla to Punta Maracayo in Arecibo.
4. From Punta Caracoles in Arecibo to Punta Salinas in Catano.
5. From San Juan (Punta del Morto) to Playa Sardinera in Fajardo.
6. From Playa de Fajardo to Punta Cabra de Tierra in Ceiba.
7. From Punta Cascajo in Ceiba to Playa de Naguabo.
8. From El Morrillo to Punta Icacos in Yabucoa.
9. From Punta Yeguas in Yabucoa to Punta Rodeo in Aguirre.
10. From Punta Colchones in Salinas to Punta Carenero in Ponce.
11. From Punta Cuchara in Ponce to Cayo Parguera in Guayanilla.
12. From Punta Verraco in Guayanilla to Bahía de Guánica.
13. From Bahía de Guánica to Bahía Parguera in Lajas.
14. Isla de Culebra except the port of Dewey.
15. From Punta Mulos east to Bahía Mosquito in Vieques.
16. From Bahía Mosquito to Cayo de Tierra in Vieques.
17. From Cayo Real west to Puerto Isabel Segunda.
18. Isla Monito.
19. Isla Desecheo.
20. Isla de la Mona.
21. Isla Caja de Muertos.
22. Cayo Icacos.
23. Cayos de Cana Gorda, Guánica.
24. All lagoons not classified under any other class in these Regulations.

3.1.2.1 Shellfish growth areas

Those areas that are designated by the Board as "Shellfish growth areas." The existing water quality regulations established by both the U.S. Public Health Service and the Department of Health of the Commonwealth of Puerto Rico shall be applied to this classification. This classification will be applied 100 meters beyond the physical and geographical areas limiting the shellfish growth areas.

3.1.3 Class SC

The classification of these areas shall be applied from the zone subject to the ebb and flow of tides (mean sea level) to three (3) nautical miles (5.559 meters) seaward.

1. Mayaguez Bay—from Punta Guanajibo to Punta Algarrobo.
2. Aguadilla Bay—from Punta Boquerón to Punta Borinquen.
3. Arecibo Bay—from Punta Maracayo to Punta Caracoles.
4. San Juan Bay including Laguna San José—from Punta Salinas to Punta del Morro.
5. Fajardo Bay—from Playa Sardinera to Playa de Fajardo.
6. Roosevelt Roads—from Punta Cabra de Tierra to Punta Cascajo.
7. Port of Naguabo—from Playa de Naguabo to El Morrillo.
8. Port of Yabucoa—from Punta Icacos to Punta Yeguas.

APPENDIX D

BORING LOGS

176

ESE
P. O. Box ESE
GAINESVILLE, FLORIDA 32602
(904) 372-3318

JOB Ft. Buchanan - Boring DB
SHEET NO. ____ OF ____
CALCULATED BY ATE DATE 4/21/83 time
CHECKED BY ____ DATE ____
SCALE ____

Geotek CME 45 rig

DEPTH	SAMPLE	LITHOLOGY, COLOR	BLOW COUNT (6" intervals)
3.0'-4.5'	18" recovered sample #1 includes ironstone piece described at right	CH clay, highly plastic, v. low moisture ~~tends to~~ crumble, cohesive, v. stiff 10YR 8/6 yellow } mixed, horizontal 10R 6/6 light red } ~~layers~~, mottled residuum, black ironstone nodules ~ 5% 1% white limestone nodules last 1½" black ironstone piece 1½" diam.	~~4,6~~, 4, 6, 9
5.0-6.5'	12" recovered sample #2	CH clay, highly plastic, v. low moisture 10R 4/6 red } mottled, mixed 10YR 8/6 y" } residuum, 5% black nodules 1% white limestone nodules ~~tends~~ blocky, cohesive, stiff	3, 4, 6
7.0'-8.5'	10" recovered sample #3	CH clay, v. highly plastic, v. low moisture, blocky, cohesive, ~~gr~~ grey clay is waxy 5YR 7/1 light grey 10R 4/8 red 10YR 5/4 yellowish-brown residuum, 5% black nodules 1% white limestone nodules very stiff, very cohesive, thin banding between grey and red clay	3, 3, 4

ESE
P. O. Box ESE
GAINESVILLE, FLORIDA 32602
(904) 372-3318

JOB Ft. Buchanan, Boring U1

SHEET NO. ______ OF ______

CALCULATED BY ATC DATE 4/21/83

CHECKED BY ______ DATE ______

SCALE ______

DEPTH	SAMPLE	LITHOLOGY, COLOR	(6" intervals) BLOW COUNT
9.0'-10.5'	12" recovered Sample #4	CH clay, highly plastic, moist, v. cohesive, medium stiff, blocky, colors more uniform with less distinct mottles [2.5YR 6/6 light red - major color [5YR 7/1 light grey - small flecks (~10%) 5% black nodules 1% white limestone nodules residuum, ~~so~~ banding fairly distinct	2,3,2
11'-12.5'	14" recovered Sample #5	CH clay, highly plastic, moist - increasing moisture with depth, med stiff - softens to med. soft with depth, banding less distinct, cohesive. [2.5YR 5/8 red - major color 5YR 7/1 light-grey - small flecks 5% black nodules 1% white limestone nodules ~~red~~ residuum	1,2,2
~~13.0-14.5'~~ 13'-14.5'	11" recovered Sample #6	CH clay, highly plastic, ~~very~~ low moisture stiff, cohesive, blocky, [10YR 5/6 yellowish-brown - major color [2.5YR 5/8 red } minor colors, ~15% [5YR 7/1 light grey } 5% black nodules 1% white limestone pieces residuum, no banding	2,4,6

ESE
P. O. Box ESE
GAINESVILLE, FLORIDA 32602
(904) 372-3318

JOB ______
SHEET NO. ______ OF ______
CALCULATED BY AT Evans DATE 4/21/83
CHECKED BY ______ DATE ______
SCALE ______

DEPTH	SAMPLE	LITHOLOGY, COLOR	(6" interval) BLOW COUNT
~~20~~ 19'-20.5'	16" recovered sample #7	MH/CH clay, very plastic, ~~stiff~~, very slightly moist, very cohesive, reddish with grey inclined fissuring in various directions 10YR 7/8 yellow MH major color 5Y 6/2 Light olive grey CH minor color 2% v. small white limestone nodules residuum, no apparent bedding blocky, MH material crumbly	4, 6, 8
24'-25.5'	18" recovered slightly over-driven sample # 8	~~M~~ CL clay, plastic, moist, med. soft, cohesive, ~~contains a 1½" lens of sandy clayey sand of low plasticity and lens of silty decomposed limerock of low plasticity~~; ½" lens of dark sand with trace of fines, fine texture, moist, NP CL clay 10YR 5/6 yellowish-brown SP sand 10YR 3/3 dark brown 5% black nodules some ~~silty~~ light limey material at very bottom of sample, low plasticity, also, a few very weathered small (<1.0%) shell fragments, gradual change from previous material, residuum, no apparent banding one small wet fissure	1, 4, 3

JOB	Ft. Buchanan - Boring U8
SHEET NO.	OF
CALCULATED BY	ATEvans DATE 4/21/83
CHECKED BY	DATE
SCALE	

ESE
P. O. Box ESE
GAINESVILLE, FLORIDA 32602
(904) 372-3318

DEPTH	SAMPLE	LITHOLOGY, COLOR	(6" interval) BLOW COUNT
29'-30.5'	18" recovered sample #9	SC-SM loamy sand, low plasticity dense, fine textured with a few scattered coarse pieces (5%) some ironstaining, est. 75% sand [10YR 6/8 brownish yellow; 5Y 7/4 pale yellow - major color] residuum, no apparent bedding. very slightly moist	15, 23, 36
34-35.5'	10" recovered sample #10	Weathered clayey sandy limestone 2.5Y 8/2 white badly fractured, wet, 10% sand 10% clay - plastic	38, 50 for 4"
~~39-40.5~~ ~~39.8~~ 39-39.8'	9" recovered sample #11	Weathered clayey sandy limestone, very slightly moist, badly fractured [5Y 7/4 pale yellow; 5Y 8/1 white] 75% rock 25% pale yellow clay & rock flour clays is plastic	40, 50 for 3"

EOB at ~~39.8~~' 40.0'

FORT BUCHANAN SHALLOW BORINGS

PERFORMED 4/18-21/83

BORING PT-1 14' S. of fence (property line)
27' W. of reference point

0.0 - 0.5' Mixed red, brown, and yellowish-brown moist clay with small limestone pebbles; plastic (CL)

0.5' - 1.0' Yellowish-brown stiff clay with small limestone pebbles; plastic, slightly moist (CL)

1.0' - 3.0' Yellowish-brown stiff clay with small limestone pebbles and small black plinthite nodules below 1.5 feet. Dry, cohesive, plastic when moistened (CL)

3.0' - 4.0' Mixed dark brown and red stiff clay with small plinthite nodules; dry, plastic when moistened, cohesive. Black 1/2" pebble between 3.5' and 4.0' (CL)

4.0' - 5.5' Brownish-yellow stiff clay with small limestone pebbles; dry, increasing plasticity with depth when moistened (CL)

BORING PT-1 (continued)

5.5' - 6.0' Mixed red and brown stiff clay; plastic, slightly moist (CL)

6.0' - 6.5' Mixed red, grey, and brown stiff clay; plastic, slightly moist (CL)

6.5' - 7.0' Mixed red, yellowish-brown, and brown stiff clay; plastic, slightly moist (CL)

7.0' - 7.5' Greenish-grey very plastic stiff clay; moist, waxy texture (CH)

7.5' - 8.0' Mixed red, grey, and brown stiff clay, slightly moist, plastic (CL)

EOB at 8.0'

13

BORING PT-2 — 14' S. of property line, 2' W. of Reference point

0.0' - 0.5' Mixed brown and red stiff clay with small limestone fragments; plastic when moistened, dry except moist for first inch (CL)

0.5' - 1.0' Mixed red, brown, and yellowish-brown stiff clay; plastic when moistened, dry (CL)

1.0' - 2.0' Yellowish-brown stiff dry clay with some small limestone fragments and black plinthite nodules; plastic when moistened (CL)

2.0' - 3.0' Mixed yellowish-brown and red stiff dry clay with small limestone fragments; plastic when moistened (CL)

3.0' - 4.0' Dark brown stiff clay with small limestone pebbles; plastic, dry to very slightly moist (CL)

4.0' - 4.5' Yellowish-brown stiff clay; very slightly moist, plastic (CL)

BORING PT-2 (continued)

4.5′ - 5.0′: Mixed yellowish-brown and grey stiff clay; slightly moist, very plastic (CH)

5.0′ - 5.5′ Mixed grey and yellow stiff and very plastic clay; slightly moist (CH)

5.5′ - 6.0′ Mixed brown and brownish yellow stiff clay; slightly moist (CL)

6.0′ - 7.0′ Mixed red, brown, and yellowish-brown stiff clay; slightly moist (CL)

7.0′ - 7.5′ Greyish-yellow stiff dry clay; plastic when moistened (CL)

7.5′ - 8.0′ Mixed grey and brown stiff clay, slightly moist, plastic (CL)

EOB at 8.0′

14

BORING PT-4 20' S. of property line
89' W. of reference point

0.0' - 0.5' Reddish-brown very stiff clay; dry, plastic when moistened (CL)

0.5' - 1.0' Reddish-brown stiff clay with small black limestone pieces and small black plinthite nodules; dry, plastic when moistened, crumbly (CL)

1.0' - 1.5' Red clay with black plinthite nodules; stiff, very slightly moist, plastic (CL)

1.5' - 2.0' Mixed red and light grey stiff clay; slightly moist, plastic (CL-CH)

2.0' - 2.5' Mixed red, light grey, and brown stiff clay with small limestone fragments; slightly moist, plastic (CL)

2.5' - 3.0' Numerous small limestone pieces in reddish-brown stiff clay matrix; clay is plastic, dry. (GC-SC)

3.0' - 3.5' Light grey to white stiff clay; very plastic when moistened, dry (CH)

BORING PT-4 (continued)

3.5' - 4.0' Mixed brownish-yellow, brown, and red stiff clay; dry, plastic when moistened (CL)

4.0' - 6.5' Mixed yellow, brown and red stiff clay; dry, plastic when moistened (CL)

6.5' - 7.0' Mixed yellow, brown, red, and light grey clay; dry, stiff, plastic when moistened. (CL)

7.0' - 8.0' Light grey stiff clay with reddish-brown streaks; dry, plastic when moistened (CL)

EOB at 8.0'

124

BORING PT-5   20' S. of property line
34' W. of reference point

0.0' - 1.5' Mixed red, brown, and brownish-yellow stiff clay; plastic, slightly moist to moist (CL)

1.5' - 2.0' Brownish-yellow stiff clay with small black plinthite nodules; dry, plastic when moistened (CL)

2.0' - 4.5' Yellowish-brown stiff clay, occasional small black plinthite nodules; dry to very slightly moist, plastic (CL)

4.5' - 7.0' Reddish-brown and grey mixed stiff clay; plastic, very slightly moist (CL)

EOB at 7.0'

BORING PT-6   26' S. of property line
10.5' W. of reference point

0.0' - 0.5' Mixed yellowish-brown and red clay with small black plinthite nodules; stiff, plastic, very slightly moist (CL)

0.5' - 1.0' Brownish-red stiff clay with small limestone fragments; dry, plastic when moistened (CL)

1.0' - 3.5' Yellowish-brown stiff clay; dry, plastic when moistened (CL). Some limestone fragments between 2.5' and 3.0'

3.5' - 5.0' Yellowish-brown stiff clay; very slightly moist, plastic, small piece of wood at 4.0', a few black nodules below 4.5' (CL)

5.0' - 6.5' Reddish yellow and brown clay with scattered layers of red clay; stiff, plastic, very slightly moist (CL)

EOB at 6.5'

BORING PT-7 27' South of property
3' East of reference point

0.0' - 1.0' Mixed red, yellowish-brown, and brown clay with sand; plastic, very stiff, very slightly moist (SC-CL)

1.0' - 6.5' Brownish-yellow clay with small limestone fragments and black plinthite nodules; stiff, plastic, very slightly moist (CL)

EOB at 6.5'

BORING PT-11   27′ S. of property line
25.5′ W. of reference point

0′ - 1.0′ Brown stiff clay; slightly moist, some black nodules and small limestone fragments, slighty moist, plastic (CL)

1.0 - 6.0′ Yellowish-brown and red mixed clays with small limestone fragments and small black nodules; occasional small pieces of wood, stiff, plastic, slightly moist (CL)

EOB at 6.0′

BORING PT-12 32' S. of property line
5' W. of reference point

0' - 1.0' Brown stiff clay with limestone fragments and black small plinthite nodules; dry, plastic when moistened (CL)

1.0' - 2.0' Reddish-brown clay with small limestone fragments and small black plinthite nodules; dry, stiff, plastic when moistened (CL)

2.0' - 4.0' Brownish-yellow and red mixed stiff clay; dry, plastic when moistened (CL)

4.0+ Rock - cannot be penetrated despite 2 tries with sampling tube - EOB

BORING PT-13 22 S. of property line
Directly south of reference point

0′ - 2′ Mixed red and brownish-yellow stiff clay with small black nodules and small limestone fragments; slightly moist, plastic (CL)

2.0′ - 6.0′ Mixed red, brownish-yellow, and dark brownish-green stiff clay with small limestone fragments and small black plinthite nodules; piece of flinty aggregate at 4.0′. Increasing moisture content and plasticity with depth. - quite moist by 6.0′ (CH-CL)

EOB at 6.0′

142

BORING PT-14   19' S. of property line
23' E of reference point

0.0'- 3.0' Mixed brown and yellowish-grey very stiff clay with low amounts of sand, some small limestone fragments, moist, plastic (CL) Piece of limerock cobble at 3.0'

3.0' - 5.0' Dark brown stiff clay with small black plinthite nodules - large amounts of nodules between 3.4' and 4.0'. Slightly moist, plasti (CL, GC)

5.0' - 8.2' Mixed dark brown and reddish-brown stiff clay; slightly moist to moist with increasing moisture with depth, plastic. (CL)

EOB at 8.2'

BORING PT- 15   22' S. of property line
106' W. of reference point

0.0' - 1.0' Reddish-brown stiff clay; dry, plastic when moistened (CL)

1.0' - 2.0' Reddish-yellow and brown clay with small black plinthite nodules; plastic, very slightly moist (CL)

2.0' - 5.0' Yellowish-brown stiff clay with numerous small black nodules increasing in quantity with depth; slightly moist, plastic (CL)

5.0' - 6.5' Brownish-yellow stiff dry clay; plastic when moistened (CL)

EOB at 6.5'

188

BORING PT-16 24.5' W. of reference point
19' S. of property line

0.0' - 1.0' Mixed red and brownish-yellow stiff clay; slightly moist, plastic (CL)

1.0' - 3.0' Yellowish-brown stiff clay with small limestone fragments and black nodules; dry, plastic when moistened (CL)

3.0' Refusal at 3.0' because of rock despite 2 attempts - FOB

BORING PT-17 19' S. of property line
20' W. of reference point

0.0' - 1.0' Mixed red and brownish-yellow clay; stiff, slightly moist, plastic (CL)

1.0' - 2.0' Yellowish-brown stiff clay; very slightly moist, plastic (CL)

2.0' - 4.0' Brown clay with small limestone fragments and small black plinthite nodules; dry, stiff, plastic when moistened (CL)

4.0' - 5.0' No sample; rock pushed by sampler

5.0' - 6.0' Mixed brown and grey clay; stiff, slightly moist (CL)

EOB at 6.0'

146

BORING PT- 18 19' S. of property line
14.5' W. of reference point

0.0 - 1.0' Reddish-brown stiff clay; slightly moist, plastic (CL)

1.0' - 3.0' Yellowish-brown clay with small limestone fragmen[ts] and small plinthite nodules; dry to slightly moist, plastic, stiff (CL)

3.0 - 4.0' Reddish-brown clay with small limestone fragments and black plinthite nodulos; stiff, plastic, slightly moist (CL)

4.0' - 4.5' Reddish-brown clay with small limestone fragments; stiff, plastic, slightly moist (CL)

4.5' Refusal because of rock - EOB

BORING PT-19 23' S. of property line
6' W. of reference point

0.0'- 2.0' Mixed red and yellowish-brown stiff clay with small black nodules and limestone fragments; very slightly moist, plastic (CL)

2.0'- 4.0' Yellowish-brown clay with small black nodules and limestone fragments; dry, stiff, plastic when moistened (CL)

4.0'- 5.0' Mixed red, brown, and grey stiff clay, very slightly moist, plastic (CL)

5.0'- 6.5' Mixed red, and brownish-yellow clay with a few limestone fragments and small black nodules; moist, plastic, stiff (CL)

EOB at 6.5'

cel

BORING PT-19R 19' S. of property line
61' E of reference point

0.0' - 1.0' Yellowish-brown stiff clay with decomposed wood; dry, plastic when moistened (CL)

1.0' - 3.0' Yellowish-brown stiff clay with limestone fragments; dry, plastic when moistened (CL)

3.0' - 4.0' Yellowish-brown clay with angular limestone pieces; stiff, dry, plastic when moistened (CL

4.0' - 5.0' Yellowish-brown stiff dry clay; plastic when moistened (CL)

EOB at 5.0'

BORING PT-20 16' S. of property line
91' E. of reference point

0.0' - 1.0' Yellowish-brown stiff clay; dry, plastic when moistened (CL)

1.0' - 4.5' Mixed yellow, red, and brown stiff clay with numerous small black plinthite nodules and some small limestone fragments; dry, plastic when moistened (CL-GC). Thin layer of grey dry clay at 4.0'

EOB at 4.5'

APPENDIX E

SAMPLING METHODOLOGY

APPENDIX E
SAMPLING METHODOLOGY

A total of 17 shallow soil borings were performed between the installation boundary and the PRASA water line. The purpose of these borings was to determine the profile of the shallow soils and to gather samples for laboratory chemical analysis. The location of each shallow boring was established with respect to an arbitrary reference point set up along the installation boundary (see Fig. 3.1-2). A T-handled hand auger was used with a 1-in diameter Oakfield sampling tube, either pushed by hand or driven with a sledge hammer. Samples were taken from the Oakfield tube and placed in appropriately labeled clean sample jars. All implements were scrubbed with soapy water and clear water between holes to prevent cross-contamination. The hand auger borings ranged in depth from 5 to 8 ft.

In general, the soils encountered during this phase were heavy clays of high plasticity with low amounts of sand and small limestone fragments. Numerous small (less than 1/8-in diameter) black iron nodules were noted below 1 ft in depth in most of the boreholes. The predominant colors of the clays were yellowish-brown, red, and grey. The latter two colors were noted to be often deposited in very thin alternating bedding layers. The moisture content in the first several feet ranged from nearly dry to slightly moist, well below the point of optimum plasticity. The consistency was very stiff and massive, the drier material friable and some drying cracks were evident. Occasional limestone cobbles up to several inches in dimaeter were noted, as were trace amounts of flintly aggregate up to 1 in in diameter and occasional pieces of wood. There was no evidence of any containers buried in the soil or of any foreign material other than those described above. These soils are composed of residual materials formed from the slow decomposition of limestone and volcanic rock, and are classified as part of the Almirante series of clay.

In addition to the test borings, two trenches were dug by backhoe to give a visual profile of the soil. One trench was located 10 ft east of the reference point RP; the second trench was located 20 ft west of RP. Both trenches were aligned with the major axis perpendicular to the installation boundary, were between 20 and 25 ft long, 5 ft wide and 6 to 7 ft deep. The eastern trench was used for water sampling; the methodology is explained in that section. In both trenches, the PRASA water line was exposed, which allowed for precise location of the pipe and observation of its condition. In neither trench was there any evidence of any backfilled trenches other than the one dug for the placement of the PRASA line. Some old railroad ties, logs, and other pieces of wood were observed to be buried in the first 8 in of soil between the PRASA line and the installation boundary, and a few logs were observed to be buried in the backfill for the water line, along with a few small pieces of concrete and aggregate. The soil in the backfill was native clay found onsite; no granular soil material was observed in the PRASA trench.

DEEP BORING

To determine the thickness of the surficial clay layers and provide a means of ground water sampling, a deep boring was performed along the fence line on the northern boundary of the installation, immediately north of the suspected pesticide burial area. A CME-45 rig using 5 1/2-in outer diameter hollow-stem auger was used, with standard penetration testing and split-spoon (2-in diameter) sampling performed continuously for the first 15 ft below ground surface and every 5 ft thereafter. Between sampling, the drill stem was advanced by dry augering. The standard penetration tests were performed with a 140-lb safety hammer dropping 30 in over an interval of 24 in. The first 6 in of blowcount measurements at any sampling depth were ignored because of consolidation effects; the blow count over the remaining

18 in was recorded. An ESE geologist observed and recorded all activities during this phase.

A 3-in diameter Shelby thin-walled tube was pushed into the clay at 14.5 ft below ground level to obtain a relatively undisturbed sample for laboratory permeability testing.

Rock was encountered at a depth of 33 ft below the ground surface. This rock is a badly weathered white limestone with numerous fractures and some white to pale yellow sand and clay. Moisture content of the rock ranges from nearly dry to wet. The boring was terminated at a depth of 40 ft. No evidence of containers or other foreign material was observed during drilling.

No definite water table was encountered during the drilling, although material of a higher moisture content was found below 24 ft. Some of this moisture is probably due to the nearness of the PRASA water line, as subsequent examination of the pipeline revealed some leakage from the joints at a depth of around 9 ft below ground level. The soil is expected to have a very low permeability in the clay layers, and a higher but still low rate of water movement in the loamy sand and limerock.

GROUND WATER SAMPLING

After drilling of the deep borehole was completed, 10 ft of schedule 80 2-in diameter PVC slotted screen was installed from 39 ft to 29 ft below ground level. Above this, an additional 30 ft of Schedule 80 PVC casing, also 2 in in diameter, was installed which left a stick-up of 1 ft above the ground level. All connections were threaded; no glue was used. This casing and screen were installed temporarily to provide a means of sampling the ground water. Readings taken the next day after the casing was installed indicated a static water level of 33 to 23 ft below the top of the casing. To obtain a sample, a 2-in diameter Johnson-Kock submersible pump was used. This pump is constructed of stainless steel with all internal passages and power lines covered with Teflon® and uses clean tygon tubing to bring the sample to the surface. A volume of water equal to three well volumes was pumped before the sample (ED-1) was taken. After the water level was drawn down to a level below the pump intakes, recovery took place in approximately 30 minutes. The temporary casing was removed from the hole after sampling was completed, and the hole was sealed to the ground surface with bentonite pellets.

At the same time that the temporary well was being sampled, a trench perpendicular to the fence line was dug from 16 ft south of the fence to just south of the PRASA pipeline by backhoe. The average depth of the trench was 8 ft, which exposed the pipeline for inspection. The trench was located about 15 ft away from the temporary well. The only foreign objects found were some tree trunks and pieces of wood. Some leakage along the bottom of the joints in the pipeline was noted at a rate of several gallons per hour. A sample (ET-1) of this water was taken by dipping with a clean sample jar. It is likely that some of the water from the pipeline travelled through cracks and voids in the clay layers and is responsible for some of the wet lenses encountered during drilling of the temporary well.

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APPENDIX F

SOILS LABORATORY PROCEDURES

APPENDIX F
SOILS LABORATORY PROCEDURES

PERMEABILITY TESTING

To determine the rate at which ground water moves vertically through the soil, a falling-head permeability test was performed on the thin-wall Shelby tube sample gathered during drilling of the deep boring DB-1. This sample was taken from a depth of 14.5 to 15.8 ft below the ground surface and consists of mixed light grey, red, and yellowish-brown clays of high plasticity.

The permeability test was performed on a section of the Shelby tube which was removed from the entire tube by cutting the section with a large pipe-cutter. By using this method, disturbance of the soil was kept to a minimum. The section under study was installed in a standard 3-in permeameter set up in a configuration recommended in the U.S. Army Corps of Engineers Manual EM 1110-2-1906, Laboratory Soils Testing, for the falling-head permeability test. Two trials of 2 hours each were performed, and the final permeability result was averaged from these two trials. The rate, as determined in the laboratory, was approximately 7×10^{-9} centimeters per second, or 6.9×10^{-3} feet per year. Deaired and deionized water was used for both saturating the sample and the running of the tests.

COMPOSITING OF SOIL SAMPLES

The 17 soil samples taken from the shallow soil borings were composited into 3 samples for analyses to reduce analytical costs. The samples were air dried and pulverized using stainless steel implements before compositing. Entire individual samples were then combined to produce the composites. After thorough mixing to ensure homogeneity, the volume of material needed for analysis was split out using a Riffler sample splitter. The remainder of the composited sample was retained in a sealed container.

FALLING-HEAD PERMEABILITY TEST

DATE 5/3/83

PROJECT Fort Buchanan

BORING NO. DB-1 (Deep Boring)

SAMPLE OR SPECIMEN NO UD-1 Shelby tube sample 14.5'-15.8' depth

WT IN GRAMS: TARE PLUS DRY SOIL			DIAMETER OF SPECIMEN, CM	D	7.37
TARE			AREA OF SPECIMEN, SQ CM	A	42.67
DRY SOIL	W_s		INITIAL HEIGHT OF SPECIMEN, CM	L	8.9
SPECIFIC GRAVITY	G		INITIAL VOL OF SPEC, CC = AL	V	
VOL OF SOLIDS, CC = W_s ÷ G	V_s		INITIAL VOID RATIO = $(V - V_s) \div V_s$	e	
AREA OF STANDPIPE, SQ CM	a	0.125	CONSTANT = 2.303 × aL ÷ A	C	.00963

TEST NO.		1		2		3	
HEIGHT OF SPECIMEN, CM	L	8.9					
VOID RATIO = $(AL - V_s) \div V_s$	e						
		1a	1b	2a	2b	3a	3b
INITIAL TIME	t_0						
FINAL TIME	t_1						
ELAPSED TIME, SEC = $t_1 - t_0$	t	7200	7200				
INITIAL HEAD, CM	h_0	133.4	145.6				
FINAL HEAD, CM	h_1	133.2	145.3				
LOG $(h_0 \div h_1)$		6.52×10^{-4}	8.96×10^{-4}				
WATER TEMPERATURE, °C	T	23.9	23.9				
VISCOSITY CORRECTION FACTOR[1]	R_T	0.912	0.912				
COEFFICIENT OF PERMEABILITY,[2] CM/SEC	k_{20}	3.5×10^{-9}	9.7×10^{-9}				
	AVG	6.6×10^{-9}					

[1] CORRECTION FACTOR FOR VISCOSITY OF WATER AT 20 C OBTAINED FROM TABLE VIII

[2] $k_{20} = 2.303 \frac{a}{A}\frac{L}{t} \text{ LOG } \frac{h_0}{h_1} \times R_T = \frac{CL}{t}\left(\text{LOG } \frac{h_0}{h_1}\right) R_T$

REMARKS Mixed light grey, red, and yellowish-brown highly plastic clays

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APPENDIX G

CHEMICAL LABORATORY METHODS AND ANALYSES

APPENDIX G
CHEMICAL LABORATORY METHODS AND ANALYSES

Chemical Analysis

Three categories of analyses were performed on the samples from FTB, as shown in Table G-1. All parameters were analyzed for in the soil composites, and only those detected in the soil were analyzed in the water samples. The analyses performed included organochlorine pesticides by EPA Method 608 (USATHAMA 2-M), herbicides by EPA Method 615 (USATHAMA 8-N), and a GC/MS screen for the remainder of the pesticide groups. All analyses were semi-quantitative.

Data Management

Field and laboratory data were entered into the USATHAMA Data Management System in accordance with Data Management Requirements for Installation Assessments. For the deep soil boring, map file, field drilling file, and ground water stabilized file, data have been entered. For the shallow soil borings, only the map file and chemical file data have been entered. A 9-track magnetic tape will be mailed to USATHAMA for validation in lieu of coding sheets. ESE has performed the GEOTEST program for the confirmatory field drilling file and the ground water stabilized file. For all data files, ESE has validated the files and have elevated them from Tier I to Tier II.

Tier II file names are presented in Table G-2.

All chemical results have been entered into the data files in units acceptable to USATHAMA chemistry data acceptance routines. A complete listing of all chemical results is appended as a quick reference. These results are not in USATHAMA format, and some units in the reference table differ from the units entered into the data base.

Table G-1. Categories of Analyses

Category	Technique	EPA Method	USATHAMA Method
Organochlorine pesticides	GC	608	2-M
Herbicides	GC	615	8-N
All others detectable by GC technique	GC/MS	Acid/Base Neutrals Fractions	1-Y, 2A

Source: ESE, 1983.

Table G-2. Tier II File Names

Data File Type	USATHAMA File Name	Comments
Field Drilling	BUSAGFD83238	Well Logs
Ground Water Stabilized	BUSAGGS83238	Water Level
Chemical	BUSACSO83262	Soils
	BUSACSW83241	
	BUSACSW83238	
	BUSACGW83238	Water

Source: ESE, 1983.

Table G-3. Chemical Data

ENVIRONMENTAL SCIENCE & ENGINEERING 08/29/83 FIELD GROUP FTB-S STATUS IS PRELIMINARY

PROJECT NUMBER 81637255
SAMPLES: ALL
PROJECT MANAGER KAREN HATFIELD

PROJECT NAME FT. BUCHANAN
PARAMETERS: ALL
FIELD GROUP LEADER STEVE DENAHAN

		SAMPLE NUMBERS				
		1	2	3	BLK	BLK
PARAMETERS	STORET #	245000	245001	245002	245080	245090
DATE		4/22/83	4/22/83	4/22/83	4/22/83	4/22/83
TIME		0	0	0	0	0
ALDRIN,SED(UG/KG-DRY)	39333	<1.0	<1.0	<1.0	<1.0	<1.0
BHC,G(LINDANE)SED UG/KG-DRY	39783	<1.0	<1.0	<1.0	<1.0	<1.0
BHC,D,SED(UG/KG-DRY)	34262	<5.0	<5.0	<5.0	<5.0	<5.0
CHLORDANE,SED(UG/KG-DRY)	39351	40	200	90	<20	<20
DDD,PP',SED(UG/KG-DRY)	39311	<7.0	<7.0	<7.0	<7.0	<7.0
DDE,PP',SED (UG/KG-DRY)	39321	<3.0	6.0	4.0	<3.0	<3.0
DDT,PP',SED(UG/KG-DRY)	39301	<5.0	<5.0	<5.0	<5.0	<5.0
DIELDRIN,SED(UG/KG-DRY)	39383	<1.0	<1.0	<1.0	<1.0	<1.0
ENDOSULFAN,A,SED(UG/KG-DRY)	34364	<3.0	<3.0	<3.0	<3.0	<3.0
ENDOSULFAN,B,SED(UG/KG-DRY)	34359	<2.0	<2.0	<2.0	<2.0	<2.0
ENDOSULFAN SULF,SED, UG/KG-DRY	34354	<3.0	<3.0	<3.0	<3.0	<3.0
ENDRIN,SED(UG/KG-DRY)	39393	<1.0	<1.0	<1.0	<1.0	<1.0
HEPTACHLOR,SED(UG/KG-DRY)	39413	4.0	10	10	<1.0	<1.0
HEPTACHLOR EPO.,SED UG/KG-DRY	39423	<3.0	<3.0	<3.0	<3.0	<3.0
TOXAPHENE,SED(UG/KG-DRY)	39403	<50	<50	<50	<50	<50
MOISTURE(%WET WT)	70320	6.0	6.0	5.0	4.0	<1.0
BHC,A,SED(UG/KG)	[illegible]	<1.0	<1.0	<1.0	<1.0	<1.0
BHC,B,SED(UG/KG)	[illegible]	<3.0	<3.0	<3.0	<3.0	<3.0
DICAMBA(UG/G)	[illegible]	<1.00	<1.00	<1.00	<1.00	*<1.00
SILVEX(UG/G)	[illegible]	<1.00	<1.00	<1.00	<1.00	*<1.00

ENVIRONMENTAL SCIENCE & ENGINEERING 08/29/83 FIELD GROUP FTB-S STATUS IS PRELIMINARY

PROJECT NUMBER 81637255
SAMPLES:
PROJECT MANAGER KAREN HATFIELD

PROJECT NAME FT. BUCHANAN
FIELD GROUP LEADER STEVE DENAHAN

		SAMPLE NUMBERS				
		1	2	3	BLK	BLK
PARAMETERS	STORET #	245000	245001	245002	245080	245090
DATE		4/22/83	4/22/83	4/22/83	4/22/83	4/22/83
TIME		0	0	0	0	0
2,4-D(UG/G)	99239	<2.00	<2.00	<2.00	<2.00	*<2.00
2,4,5-T(UG/G)	99240	<1.00	<1.00	<1.00	<1.00	*<1.00
ACENAPHTHENE,SOIL(MG /KG)	99450	<0.4	<0.4	<0.4	<0.4	<0.4
ACENAPHTHYLENE,SOIL(MG/KG)	99451	<0.4	<0.4	<0.4	<0.4	<0.4
ANTHRACENE,SOIL(MG/K G)	99452	<0.4	<0.4	<0.4	<0.4	<0.4
BENZO(A)ANTHRACENE,S OIL(MG/KG)	99453	<1	<1	<1	<1	<1
BENZO(B)FLUORANTHENE ,SOIL(MG/K	99454	<0.4	<0.4	<0.4	<0.4	<0.4
BENZO(K)FLUORANTHENE ,SOIL(MG/K	99455	<0.4	<0.4	<0.4	<0.4	<0.4
BENZO(A)PYRENE,SOIL(MG/KG)	99456	<0.4	<0.4	<0.4	<0.4	<0.4
BENZO (GHI)PERYLENE, SOIL(MG/K	99691	<2.0	<2.0	<2.0	<2.0	<2.0
BENZIDINE,SOIL(MG/KG)	99457	<0.6	<0.6	<0.6	<0.6	<0.6
BIS(2-CHLRETH)ETHER, SOIL(MG/KG	99458	<1	<1	<1	<1	<1
BIS(2-CHLETHOXY)METH ,SOIL(MG/K	99459	<0.6	<0.6	<0.6	<0.6	<0.6
BIS(2-E-H)PHTHALATE, SOIL(MG/KG	99460	<0.4	<0.4	<0.4	<0.4	<0.4
BIS(2-CHLISOPR)ETHER, SOIL(MG/KG	99461	<3.0	<3.0	<3.0	<3.0	<3.0
4-BROMOPHPHETHER,SOI L(MG/KG)	99462	<3.0	<3.0	<3.0	<3.0	<3.0
BUTHPHTHALATE,SOIL(M G/KG)	99463	<3.0	<3.0	<3.0	<3.0	<3.0
2-CHLNAPHTHALENE,SO IL(MG/KG)	99464	<0.4	<0.4	<0.4	<0.4	<0.4
4-CHLPHPHETHER,SOIL (MG/KG)	99465	<0.6	<0.6	<0.6	<0.6	<0.6
CHRYSENE, SOIL (MG/K G)	[illegible]	<1	<1	<1	<1	<1

G-5

ENVIRONMENTAL SCIENCE & ENGINEERING 08/29/83 FIELD GROUP FTB-S STATUS IS PRELIMINARY

PROJECT NUMBER 61637255 PROJECT NAME FT. BUCHANAN
SAMPLES:
PROJECT MANAGER KAREN HATFIELD FIELD GROUP LEADER STEVE DENAHAN

		SAMPLE NUMBERS				
		1	2	3	BLK	BLK
PARAMETERS	STORET #	245000	245001	245002	245080	245090
DATE		4/22/83	4/22/83	4/22/83	4/22/83	4/22/83
TIME		0	0	0	0	0
DIBENZO(A,H)ANTHRA,SOIL(MG/KG)	99466	<1	<1	<1	<1	<1
DI-N-BUTYLPHTH,SOIL(MG/KG)	99467	0.7	0.6	2	<0.4	<0.4
1,3DICHLRBENZENE,SOIL(MG/KG)	99468	<3.0	<3.0	<3.0	<3.0	<3.0
1,4-DICHLRBENZ ,SOIL(MG/KG)	99469	<3.0	<3.0	<3.0	<3.0	<3.0
1,2-DICHLRBENZENE,SOIL(MG/KG)	99470	<3.0	<3.0	<3.0	<3.0	<3.0
3,3-DICHLRBENZIDINE, SOIL(MG/KG	99471	<0.6	<0.6	<0.6	<0.6	<0.6
DIETHYLPHTHALATE,SOIL(MG/KG)	99472	<0.4	<0.4	0.4	<0.4	<0.4
DIMETHYLPHTHALATE,SOIL(MG/KG)	99473	<0.4	<0.4	<0.4	<0.4	<0.4
2,4-DNT,SOIL(MG/KG)	99474	<0.6	<0.6	<0.6	<0.6	<0.6
2,6-DNT,SOIL(MG/KG)	99475	<0.6	<0.6	<0.6	<0.6	<0.6
DIOCTYPHTHALATE,SOIL (MG/KG)	99476	<0.4	<0.4	<0.4	<0.4	<0.4
1,2-DIPHENYLHYDRAZINE,SOIL(MG/	99477	<0.4	<0.4	<0.4	<0.4	<0.4
FLUORANTHENE,SOIL (MG/KG)	99689	<0.4	<0.4	<0.4	<0.4	<0.4
FLUORENE, SOIL (MG/KG)	99692	<3.0	<3.0	<3.0	<3.0	<3.0
HEXACHLOROBENZENE,SOIL(MG/KG)	99478	<0.6	<0.6	<0.6	<0.6	<0.6
HEXACHLOROBUTADIENE, SOIL(MG/KG	99479	<0.6	<0.6	<0.6	<0.6	<0.6
HEXACHLOROETHANE,SOIL(MG/KG)	99480	<0.6	<0.6	<0.6	<0.6	<0.6
HEXACHLRCYCLOPENTADIENE,SOIL(MG	99481	<0.6	<0.6	<0.6	<0.6	<0.6
INDENO(1,2,3-CD)PYR, SOIL(MG/KG	99482	<1	<1	<1	<1	<1
ISOPHORONE,SOIL(MG/KG)	99483	<0.4	<0.4	<0.4	<0.4	<0.4

ENVIRONMENTAL SCIENCE & ENGINEERING 08/29/83 FIELD GROUP FTB-S STATUS IS PRELIMINARY

PROJECT NUMBER P1637255 PROJECT NAME FT. BUCHANAN
SAMPLES:
PROJECT MANAGER KAREN HATFIELD FIELD GROUP LEADER STEVE DENAHAN

		SAMPLE NUMBERS				
		1	2	3	BLK	BLK
PARAMETERS	STORET #	245000	245001	245002	245080	245090
DATE		4/22/83	4/22/83	4/22/83	4/22/83	4/22/83
TIME		0	0	0	0	0
NAPHTHALENE,SOIL(MG/KG)	99696	<0.4	<0.4	<0.4	<0.4	<0.4
NITROBENZENE,SOIL(MG/KG)	99485	<1.0	<1.0	<1.0	<1.0	<1.0
N-MEHTYLAMINE,SOIL(MG/KG)	99486	<2.0	<2.0	<2.0	<2.0	<2.0
N-PROPYLAMINE,SOIL(MG/KG)	99487	<3.0	<3.0	<3.0	<3.0	<3.0
N-SODIPHENYLAMINE,SOIL(MG/KG)	99488	<1	<1	<1	<1	<1
PHENANTHRENE,SOIL(MG/KG)	99489	<0.4	<0.4	<0.4	<0.4	<0.4
PYRENE,SOIL(MG/KG)	99490	<0.4	<0.4	<0.4	<0.4	<0.4
2,3,7,8-TCDD,SOIL(MG/KG)	99491	<0.4	<0.4	<0.4	<0.4	<0.4
1,2,4-TRICHLOROBENZENE,SOIL(MG	99492	<1	<1	<1	<1	<1
3-NITROTOLUENE,SOIL(MG/KG)	99679	<0.6	<0.6	<0.6	<0.6	<0.6
3,5-DINITROANILINE,SOIL (MG/KG	99688	<2.0	<2.0	<2.0	<2.0	<2.0
2,AMINO-4,6-DNT,SOIL(MG/KG)	99687	<3.0	<3.0	<3.0	<3.0	<3.0
4-CHLORO-M-CRESOL,SOIL (MG/KG)	99683	<0.8	<0.8	<0.8	<0.8	<0.8
2-CHLOROPHENOL,SOIL(MG/KG)	99497	<0.8	<0.8	<0.8	<0.8	<0.8
2,4-DICHLOROPHENOL,SOIL(MG/KG)	99498	<0.2	<0.2	<0.2	<0.2	<0.2
2,4-DIMETHYPHENOL,SOIL(MG/KG)	99499	<0.8	<0.8	<0.8	<0.8	<0.8
2,4-DINITROPHENOL,SOIL(MG/KG)	99655	<0.4	<0.4	<0.4	<0.4	<0.4
4,6-DINITRO-O-CRESOL,SOIL(MG/K	99616	<0.4	<0.4	<0.4	<0.4	<0.4
2-NITROPHENOL,SOIL(MG/KG)	99495	<0.4	<0.4	<0.4	<0.4	<0.4
4-NITROPHENOL,SOIL(MG/KG)	99496	<0.2	<0.2	<0.2	<0.2	<0.2

ENVIRONMENTAL SCIENCE & ENGINEERING 08/29/83 FIELD GROUP FTB-S STATUS IS PRELIMINARY

PROJECT NUMBER 81637255 PROJECT NAME FT. BUCHANAN
SAMPLES:
PROJECT MANAGER KAREN HATFIELD FIELD GROUP LEADER STEVE DENAHAN

		SAMPLE NUMBERS				
		1	2	3	BLK	BLK
PARAMETERS	STORET #	245000	245001	245002	245080	245090
DATE		4/22/83	4/22/83	4/22/83	4/22/83	4/22/83
TIME		0	0	0	0	0
PENTACHLOROPHENOL,SOIL (MG/KG)	99682	<0.2	<0.2	<0.2	<0.2	<0.2
PHENOL,SOIL (MG/KG)	99685	<0.4	<0.4	<0.4	<0.4	<0.4
2,4,6-TRICHLOROPHENOL,SOIL(MG/	99684	<0.2	<0.2	<0.2	<0.2	<0.2

ENVIRONMENTAL SCIENCE & ENGINEERING 08/29/83

FIELD GROUP FTB-W STATUS IS PRELIMINARY

PROJECT NUMBER 81637255
SAMPLES: ALL
PROJECT MANAGER KAREN HATFIELD

PROJECT NAME FT. BUCHANAN
PARAMETERS: PART
FIELD GROUP LEADER STEVE DENAHAN

SAMPLE NUMBERS

PARAMETERS	STORET #	DB-1 244900	ET-1 244901	BLK 244980
DATE		4/22/83	4/22/83	4/22/83
TIME		0	0	0
CHLORDANE (UG/L)	39350	<0.50	<0.50	<0.50
HEPTACHLOR (UG/L)	39410	<2.0	<2.0	<2.0
4,4'-DDE (UG/L)	39320	<2.0	<2.0	<2.0
DIETHYLPHTHALATE (UG/L)	34336	<3	<3	<3
DI-N-BUTYLPHTHALATE (UG/L)	39110	<3	<3	<3

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Soil Sampling Program at Solid Waste Management Unit No. 3, Fort Buchanan, Puerto Rico

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Final report

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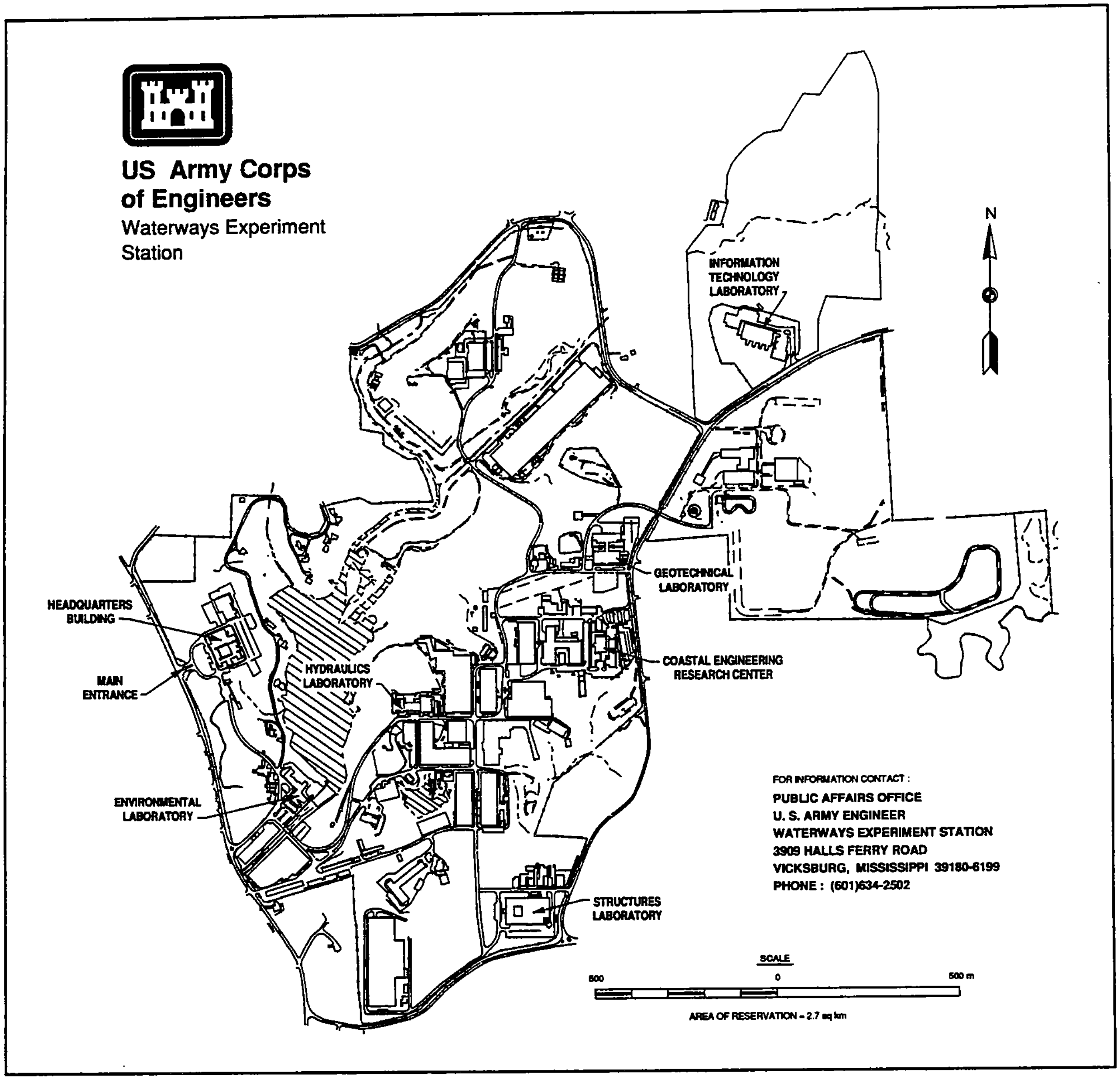

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PREFACE

A soil sampling survey was conducted at Fort Buchanan (FTB), Puerto Rico, by personnel of the Geotechnical Laboratory (GL), US Army Engineer Waterways Experiment Station (WES), between 20 and 23 October 1992. The work was performed for the US Army Environmental Center (AEC), Aberdeen Proving Ground, Maryland. The AEC Technical Monitor was Mr. Dennis Bowser.

This report was prepared by Mr. José L. Llopis, Earthquake Engineering and Geosciences Division (EEGD). The work was performed under the direct supervision of Mr. Joseph R. Curro, Jr., Chief, Engineering Geosciences Branch (EGB). The work was performed under the general supervision of Drs. A. G. Franklin, Chief, EEGD, and William F. Marcuson III, Director, GL.

Field work and data analysis were performed by Mr. Llopis. Mr. Angel Perez, Environmental Coordinator, Directorate of Engineering and Housing (DEH), FTB, provided technical support during the site preparation phase of this study. Mr. Clarence Harris, DEH, did an outstanding job in operating the backhoe used in this investigation. Mr. Robert Scarf extracted and analyzed the soil samples and the chemical analyses was reviewed by Mr. Kenneth Mioduski, US Army Environmental and Hygiene Agency (AEHA). The results of the chemical analyses were approved Mr. J. Howard Vinopal, Chief, Pesticide Analysis Branch, Organic Environmental Chemistry Division, AEHA. This report was reviewed by Dr. Paul Hadala, Assistant Director, GL, Dr. Dwain K. Butler, EGB, Mr. William L. Murphy, Engineering Geology Branch, EEGD, and Ms. Ann B. Strong, Chief, Environmental Chemistry Branch, Environmental Engineering Division, Environmental Laboratory, WES.

At the time of publication of this report, Director of WES was Dr. Robert W. Whalin. Commander was COL Leonard G. Hassell, EN.

CONTENTS

CONVERSION FACTOR, NON-SI TO SI (METRIC)
UNITS OF MEASUREMENT

Non-SI units of measurement used in this report can be converted to SI (metric) units as follows:

Multiply	By	To Obtain
Fahrenheit degrees	5/9	Celsius degrees or Kelvins*
feet	0.3048	metres
feet per second	30.48	centimeters per second
gallons	3.785412	cubic decimetres
inches	2.54	centimetres
miles (US statute)	1.609347	kilometres
ounces (US fluid)	0.02957353	cubic decimetres
tons (2,000 pounds, mass)	907.194	kilograms

* To obtain Celsius (C) temperature readings from Fahrenheit (F) readings, use the following formula: $C = (5/9)(F - 32)$. To obtain Kelvin (K) readings, use: $K = (5/9)(F - 32) + 273.15$.

SOIL SAMPLING SURVEY AT
SOLID WASTE MANAGEMENT UNIT NO. 3
FORT BUCHANAN, PUERTO RICO

PART I: INTRODUCTION

Background

1. An onsite Installation Assessment (IA) was conducted between 30 August and 3 September 1982 at Fort Buchanan (FTB), Puerto Rico. The purpose of the IA was to determine the existence of toxic and hazardous materials and related contamination at FTB, emphasizing those substances posing a potential for migration off the installation (McMaster et al. 1984). As a result of the 1982 IA one site, Solid Waste Management Unit (SWMU) No. 3, was identified as warranting further assessment.

2. In 1990 the Puerto Rico Environmental Quality Board (EQB) completed a Resources Conservation and Recovery Act (RCRA) Facility Assessment (RFA) for FTB. The EQB conducted this activity by agreement with the US Environmental Protection Agency (EPA) under the authority of RCRA. On the basis of the 1990 RFA and other documentation, the EPA determined that there was the potential for significant environmental risk at SWMU No. 3.

3. In 1977 approximately 1 ton (1 truckload) of various pesticides reportedly were buried in a shallow trench at SWMU No. 3. The suspected buried pesticides are reported as consisting of Chlordane, p,p'-DDE, and Heptachlor. McMaster et al. (1984) reported that the pesticides, mostly in bags and boxes, but also contained in numerous (10 to 20) 5-gal metal containers, were deposited into a trench estimated to be 6 ft deep, 18 ft wide, and 45 to 90 ft long. The trench was then backfilled with trees and the original soil and compacted with a bulldozer. The precise location of the burial trench is not available from records.

4. In 1980, the Puerto Rico Aqueduct and Sewage Authority (PRASA) installed a potable water supply main across FTB connecting the San Juan and Bayamon water supply systems. The 66-in dia. main is constructed of reinforced concrete and is buried at a depth of approximately 10 ft. The PRASA main passes by the suspected location of the alleged pesticide burial site and may even intersect it. The EPA is concerned that when the main is depressurized, during periodic maintenance, infiltration of contaminated groundwater through the line's seals may occur**. Two other EPA concerns are;

** June 1991. Letter from Joel Golumbek, Chief, New Jersey/Caribbean Section, Hazardous Waste Compliance Branch, Region II, US EPA to Commander, Fort McPherson.

a. The gravel underlayment of the water main could act as a conduit for the off-site migration of contaminated groundwater.

b. Many of the formations which outcrop on the site serve as aquifers and could potentially be contaminated. These aquifers have been designated as an alternative potable water supply for the area. The site is part of the recharge area for these aquifers.

Disposal Area Characteristics

5. Location of Disposal Area. FTB is located approximately 6 miles southwest of San Juan, Puerto Rico as shown in Figure 1. SWMU No. 3 is located in the northwestern part of FTB along the perimeter fence bordering Highway P.R. 28 (Figure 2). The suspected location of the pesticide burial trench at SWMU No. 3 is shown in Figure 2.

6. General Physical Conditions. SWMU No. 3 encompasses an area approximately 100 ft wide by 1500 ft in length with its major axis oriented roughly in an east-west direction (Figure 2). The site is relatively flat and can pond precipitation for a period of time. Because of the tropical marine climate (high rainfall and warm temperatures) the site is heavily vegetated with small to large trees and head-high grasses. Prior to the survey, the site was cleared of vegetation and leveled with a bulldozer.

Previous Investigations

7. The US Army Toxic and Hazardous Materials Agency (USATHAMA) (now the US Army Environmental Center (AEC)) conducted a limited contamination assessment in 1983 to determine the chemical identity of the pesticides and the composition and the geometry of the subsurface materials. One deep and seventeen shallow exploratory borings were placed and two trenches excavated at SWMU No.3. Figure 3 shows the location of the soil borings and trenches used for the 1983 contamination assessment. The deep boring was augered to a depth of 40 ft whereas the shallow borings were augered to depths ranging between 3 and 8 ft. The deep soil boring indicates that the ground water table is 33 ft below the ground surface, or approximately 27 ft below the base of the trench as reported in McMaster et al. (1984). Boring logs indicate that the soil at the site is generally a clay from 0 to 19 ft deep, silty-clay, clay, clayey-silt and silty-, clayey-sand from 19 to 33 ft deep, and is underlain by badly weathered clayey-, sandy-limestone (McMaster et al. 1984). None of the borings encountered conditions or material indicative of the

suspected trench. The log for the deep boring as reported in McMaster et al. (1984) is presented in Figure 4.

8. Two trenches were dug by backhoe to give a visual profile of the soil. The trenches were aligned with the major axis perpendicular to the installation boundary and were between 20 and 25 ft long, 5 ft wide and 6 to 7 ft deep. The trenches intersected the PRASA water main trench. Neither trench showed evidence of any backfilled trenches other than the one dug for the PRASA water main (McMaster et al. 1984). A schematic cross section of SWMU No. 3, showing the suspected location of the trench relative to the PRASA water main, is shown in Figure 5.

9. In October 1991 a comprehensive, integrated geophysical investigation was conducted at SWMU No. 3 by personnel of the US Army Engineer Waterways Experiment Station (WES). The purpose of the survey was to delineate anomalies indicative of buried waste, waste containers, and the boundaries of the burial trench. The geophysical program included electromagnetic (EM) and magnetic methods. The results of the investigation indicated numerous anomalous areas at SWMU No. 3. The locations of the interpreted anomalous areas along with a priority ranking for further investigation are presented in Llopis and Sharp (1992).

Objectives

10. During the period 20-23 October 1992 the US Army Engineer Waterways Experiment Station (WES) conducted a soil sampling program at FTB to delineate the location of the pesticide burial trench at SWMU No. 3. Test pits were excavated at various locations across SWMU No. 3 considered to be anomalous based on the results of the geophysical investigation. The test pits were visually inspected for any evidence indicating the presence of the pesticide disposal trench (i.e. rotting trees used in backfilling the alleged trench, disturbed soil or pesticide containers). Soil samples were also collected in the test pits and forwarded to a laboratory for pesticide analysis.

PART II: SOIL SAMPLING PROGRAM

Soil Sampling Procedures

11. Eight test pits (trenches) were excavated at SWMU No. 3 to a depth of 8 ft to obtain representative soil samples for laboratory chemical analysis. The locations of the test pits were based on the results of a previous geophysical survey (Llopis and Sharp 1992). Figure 6 shows the locations of the test pits superimposed on the geophysical anomaly priority map. Figure 7 illustrates the locations, dimensions, and layout of each test pit.

12. With the exception of TP7, the test pits were located in areas assigned the highest investigation priority (geophysical anomaly priorities of 1 or 2). The high priority test pits were generally located in the central and western portion of the site as shown in Figure 6. The location of test pit TP7 was located in the eastern portion of the site and was selected based on its geophysical anomaly priority of 3 and its proximity to a topographic anomaly.

13. The test pits used for this investigation were excavated using a backhoe. The test pits were dug to a depth of 8 ft, a width of 4 ft and to a length ranging between 20 and 30 ft as shown in Figure 7. The test pits were oriented in an east-west (parallel to perimeter fence) or north-south (perpendicular to perimeter fence) direction. Samples for pesticide analysis were collected in the test pits at 2-ft depth intervals.

14. During trenching operations for TP8, a concrete slab was encountered at a depth of approximately 2.5 ft. An area approximately 10 ft by 20 ft was excavated in an attempt to find the edge of the slab without success. It was presumed that the concrete slab was the cause of the geophysical anomaly and it was decided to discontinue further trenching of TP8. Further discussions in this report of any sampling or testing procedures will not pertain to TP8.

15. For sampling purposes, each test pit, with the exception of TP1, was divided into two sections. The test pit sections were designated to denote their relative geographic attitude. For example, TP2 is oriented in an east-west direction and the two test pit sections are designated TP2E (eastern end of pit) and TP2W (western end of pit). For test pits oriented in a north-south direction an "N" or an "S" after the test pit number designates the northern and southern sections of the pit, respectively.

16. At each of the test pits the upper 2 ft of soil were stripped away to remove surface debris and the material placed in a pile away from the test pit opening. Soil samples were collected at each test pit at 2-ft intervals between depths of 2 and 8 ft. With the exception of TP1, at each sampling

depth equal amounts of soil were collected from opposite ends of each test pit section, placed in a stainless steel bowl and composited. Figure 8 illustrates the relative location of the sampling points within the test pits. TP1 was not divided into two sections as were the other test pits. For the case of TP1, at each sampling depth, equal amounts of soil were collected from each end of the test pit only and composited.

17. The samples were collected from the undisturbed center portion of the backhoe bucket using a stainless steel scoop and placed in a stainless steel bowl for compositing. The composited sample was placed in a clean laboratory-certified, wide-mouthed glass jar and sealed with a teflon-lined lid. The sample jars were labeled with a waterproof marker using a labeling system identifying the trench number, trench end, depth, and date. The labelling identification key used in this investigation is shown below:

Test Pit End (Either E-W or N-S)

$\underbrace{\text{T P 2}}$ E - 8

Test Pit #   Sample Depth (ft)

The samples were preserved at a temperature of 4°C by immediately placing them in an insulated chest filled with ice. The samples were delivered by an overnight air delivery service to the laboratory within 3 days after collection.

18. After stripping away the upper 2 ft of soil, the backhoe was moved away from the test pit and the bucket cleaned prior to sampling. The bucket was cleaned by scraping away the majority of any adhered soil and washing away any remaining soil with pressurized water from a fire hose. The water used to wash the backhoe bucket was obtained from an FTB fire hydrant located adjacent the nearby Directorate of Engineering and Housing building and hauled to the site by a tanker truck provided by the FTB Fire Department. The backhoe bucket was cleaned using this method prior to sampling the subsequent test pit section or sampling depth to prevent cross contamination. After collecting a soil sample the sampling scoop and bowl were thoroughly scrubbed and washed using water supplied from the fire engine. The sampling equipment was then rinsed three times with distilled water and dried with clean paper towels.

Chemical Analysis Procedures

19. A chemical analysis of the soil samples was performed by the US Army Environmental Hygiene Agency (AEHA), Aberdeen Proving Ground, MD. The samples were analyzed for pesticides and polychlorinated biphenyls (PCB's). Sample extraction and analysis was performed using the AEHA/Organic Environmental Chemistry Division/Pesticide Analysis Branch Standing Operating Procedure #31B.1 - (Analysis for Organochlorine, Organophosphorus, Organonitrogen Pesticide and Polychlorinated Biphenyls in Soil Using a Rapid Sonication Method) (see Appendix B).

PART III: RESULTS

Visual Observations

20. The soil observed in the test pits at SWMU No. 3 can generally be characterized as a stiff plastic clay. In some locations small (less than 0.25 in. dia.), black, plinthite*** nodules were encountered. McMaster et al. (1984) report the average vertical coefficient of permeability to water (hydraulic conductivity) for the soils at the site to be 6.6 x 10^{-9} cm/sec. This is an extremely low value. No visual evidence of any pesticides, pesticide containers, or backfilled trenches was found in the excavated test pits. Some debris such as tree limbs, lumber, and steel grating was unearthed in the upper 3 ft of a few of the test pits. A description of the soils found in the test pits is presented in Appendix A.

Chemical Analysis

21. A list of primary pesticides, pesticide metabolites, and PCB's that the soil samples were screened for along with reporting limits is presented in Appendix B. The results of the chemical analysis on 52 samples tested indicate that the concentrations of all the analytes were below detection limits with the exception of soil samples TP3N-2, TP3N-4 and TP3N-6 which occur in the north section of TP3.

22. The results of the chemical analyses for the north section of TP3 are presented in Table 1. It is noted that sample TP5L-1 (AQAD Number B29921) listed in the Report of Analysis (Appendix B) is a quality control sample, not a field sample, and the results are within the acceptable range. The results in Table 1 indicate that p,p'-DDE, p,p'-DDD, p,p'-DDT, and o,p'-DDD were the only compounds found above detection levels. The highest concentration of pesticides detected was 1.64 μg/g of DDT in soil sample TP3N-4. This soil sample was a composite of two samples, and thus the highest possible concentration in either of the two original samples (prior to compositing) is 3.28 μg/g. There are no known Federal or Puerto Rico standards for DDT, DDE, or DDD in soil. AEHA personnel consider these levels of pesticides to be low

*** As defined by Bates and Jackson (1980) plinthite in a soil is a material consisting of a mixture of clay and quartz, that is rich in sesquioxides and poor in humus and is highly weathered. It occurs as red mottles in a platy, polygonal, or reticulate pattern. Repeated wetting and drying changes plinthite to ironstone hardpan or irregular aggregates.

and not indicative of a spill or disposal site****. Figure 9 shows typical amounts of DDT found in the environment: soil, water, terrestrial and aquatic plants, animals, and man. Figure 9 is included in order to provide a means of comparison between the laboratory results and typical amounts of DDT to be expected to be found in the environment.

Table 1
Results of Pesticide Analysis for TP3N

Sample Number	Sample Results $\mu g/g$ (ppm)		Detection Limits* ppm
TP3N-2	p,p'-DDE	0.26	0.16
	p,p'-DDD	0.33	0.16
	All OTHER ANALYTES BELOW DETECTION LIMITS		---
TP3N-4	p,p'-DDD	0.40	0.16
	p,p'-DDT	1.64	0.30
	ALL OTHER ANALYTES BELOW DETECTION LIMITS		---
TP3N-6	o,p'-DDD	0.28	0.16
	p,p'-DDD	0.23	0.16
	ALL OTHER ANALYTES BELOW DETECTION LIMITS		---
TP3N-8	ALL ANALYTES BELOW DETECTION LIMITS		---

All reported results are based on sample dry weight.
* See Appendix B for detection limits for target compounds not reported above.

23. The compounds DDD and DDE are transformation products of DDT. In soils, under anaerobic conditions, p,p'-DDT is rapidly converted to p,p'-DDD and under aerobic conditions very slowly to p,p'-DDE (Montgomery and Welkom 1990). The solubilities of DDT, DDD, and DDE in water are relatively low and are reported by Montgomery and Welkom (1990) to range between 0.0012 and 0.12 mg/L at a temperature of 25°C. These compounds are strongly adsorbed by the soil and are not likely to leach into the groundwater.

**** Telephone conversations with Mr. J. Howard Vinopal, Chief, Pesticide Analysis Branch, Environmental Chemistry Division, AEHA, and Mr. Jack Heller, Waste Disposal Engineering Division, AEHA, on 7 January 1993.

CONCLUSIONS

24. In 1977, approximately 1 ton (1 truckload) of various pesticides reportedly were buried in a shallow trench at an unknown location at SWMU No. 3. In an effort to determine the location of this trench, 52 soil samples were collected from 7 test pits and analyzed for the presence of pesticides. Test pit location selection was based on the results of a previously conducted geophysical investigation. The soil samples in the test pits were collected at 2-ft depth intervals between depths of 2 and 8 ft. The results of the chemical analysis indicated trace amounts of the pesticides p,p'-DDE, p,p'-DDD, p,p'-DDT, and o,p'-DDD in only one end of one test pit, TP3N. These pesticide levels are considered to be very low and not indicative of the levels expected to be associated with a pesticide disposal site but rather more indicative of routine pest control levels. Based on visual observations during the excavation of the test pits and the results of the soil chemical analysis there is no indication of the presence of a pesticide disposal trench at the locations of these seven test pits.

REFERENCES

Bates, R. L. and Jackson, J. A. 1980. In *Glossary of geology*. 2nd ed. Falls Church, VA: American Geological Institute.

Edwards, C. A. 1981. In *Persistent pesticides in the environment*. 2nd ed. Boca Raton, FL: CRC Press.

Llopis, J. L. and Sharp, M. K. 1992. Geophysical investigation at Solid Waste Management Unit No. 3 Fort Buchanan, Puerto Rico. Miscellaneous Paper GL-92-5, Vicksburg, MS: US Army Engineer Waterways Experiment Station.

McMaster, B.N., Hearns, S. R., Denehan, A. P., Hubbard, K. L., Hatfield, K. L., Govro, K. C., Hobel, M. A., and Civitarese, K. A., 1984. Installation Assessment of Fort Buchanan, P.R. Report No. 329A. Gainsville, FL: Environmental Science and Engineering, Inc.

Montgomery, J. H. and Welkom, L. M. 1990. In *Groundwater chemicals desk reference*. Chelsea, MI: Lewis Publishers.

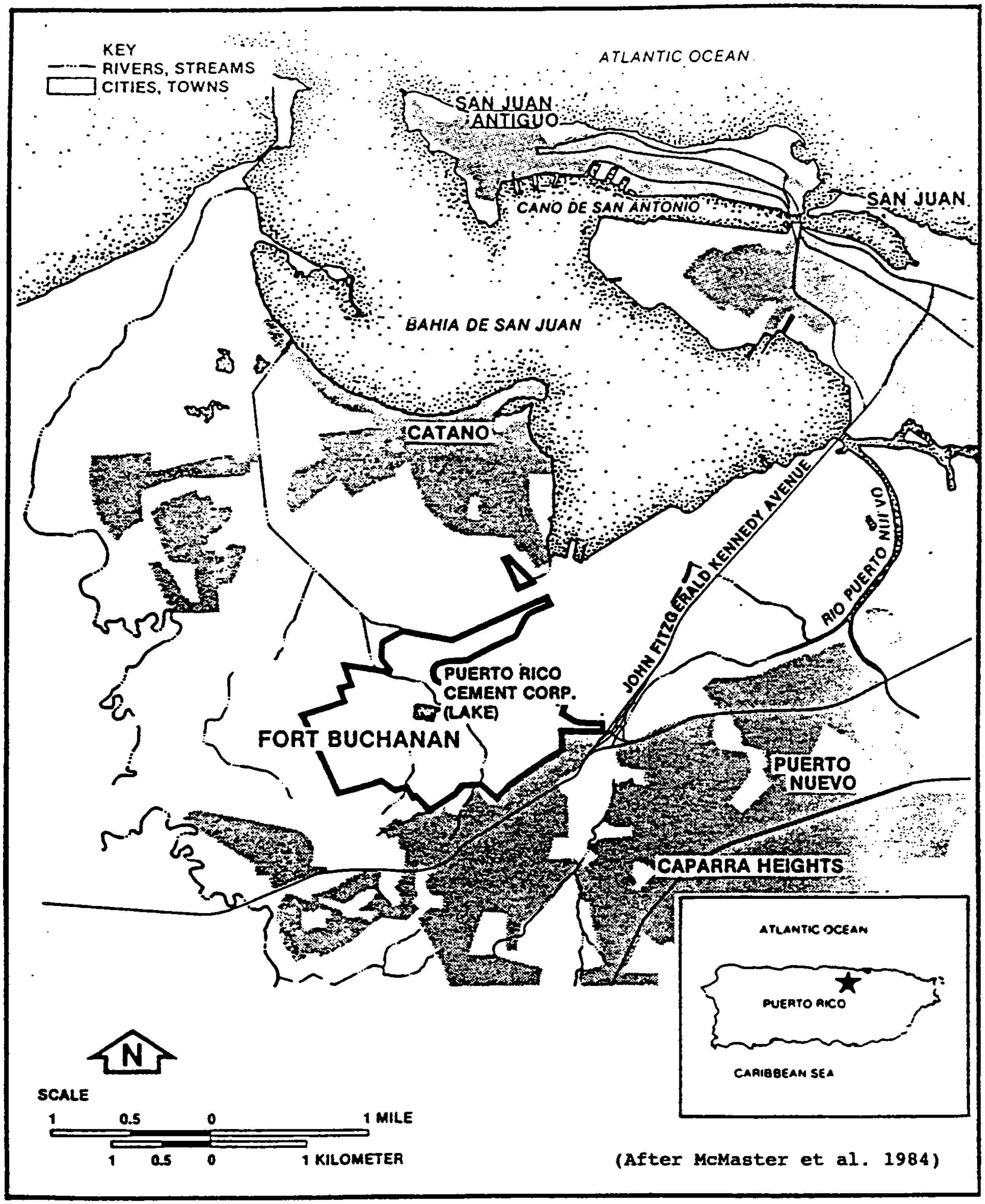


Figure 1. Vicinity map

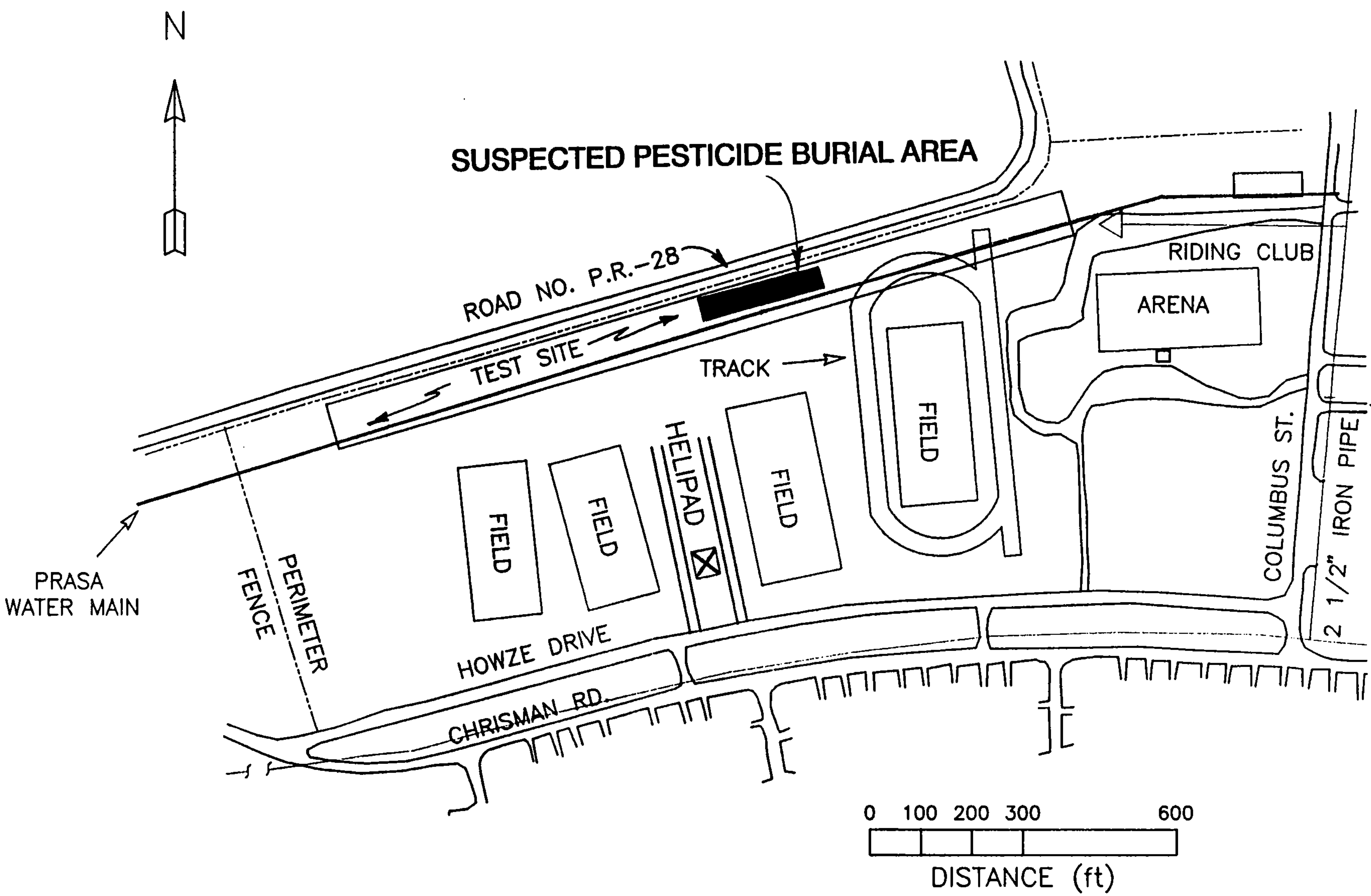


Figure 2. Location of suspected pesticide burial trench

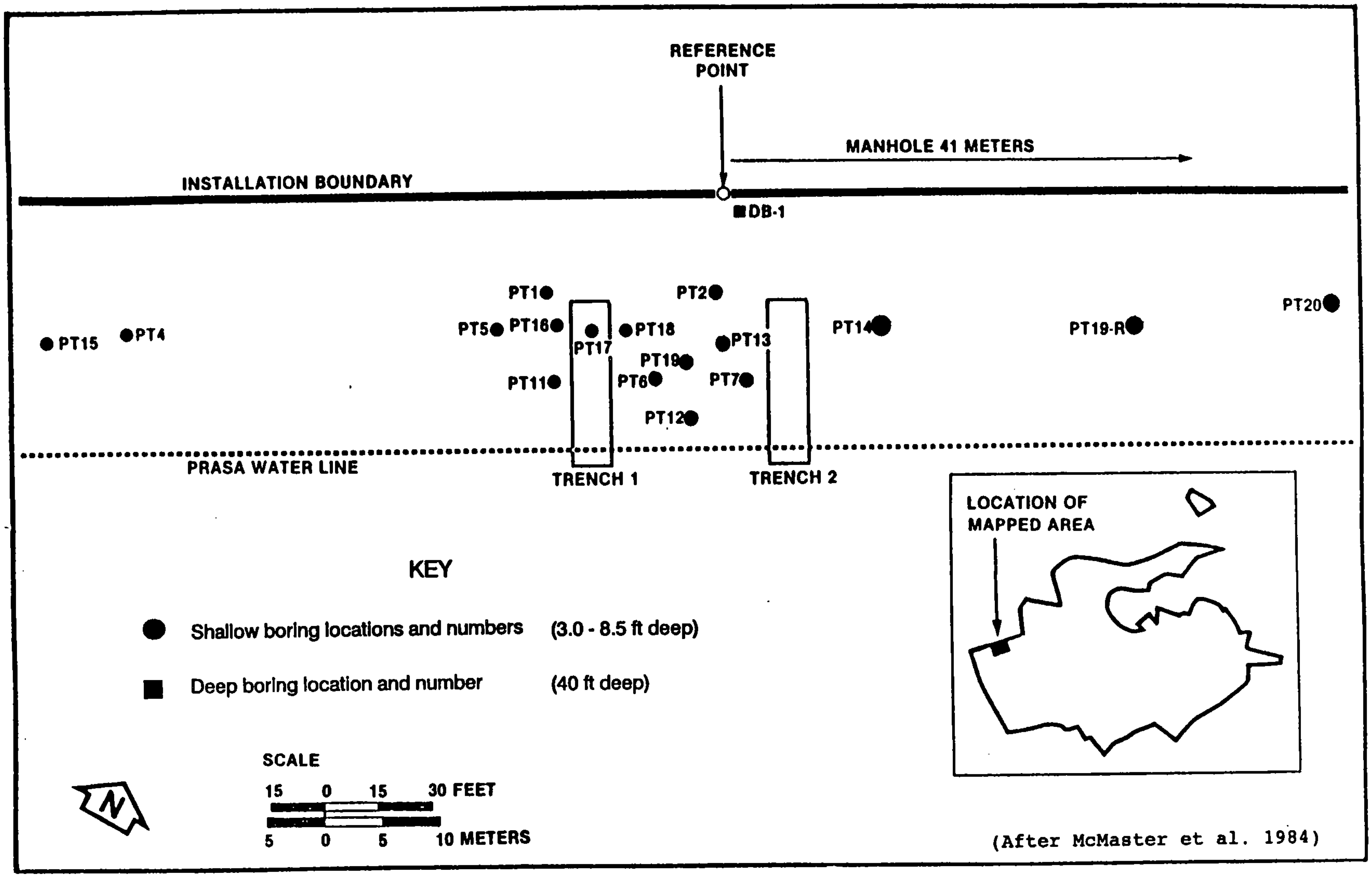


Figure 3. Location of 1983 soil borings and trenches

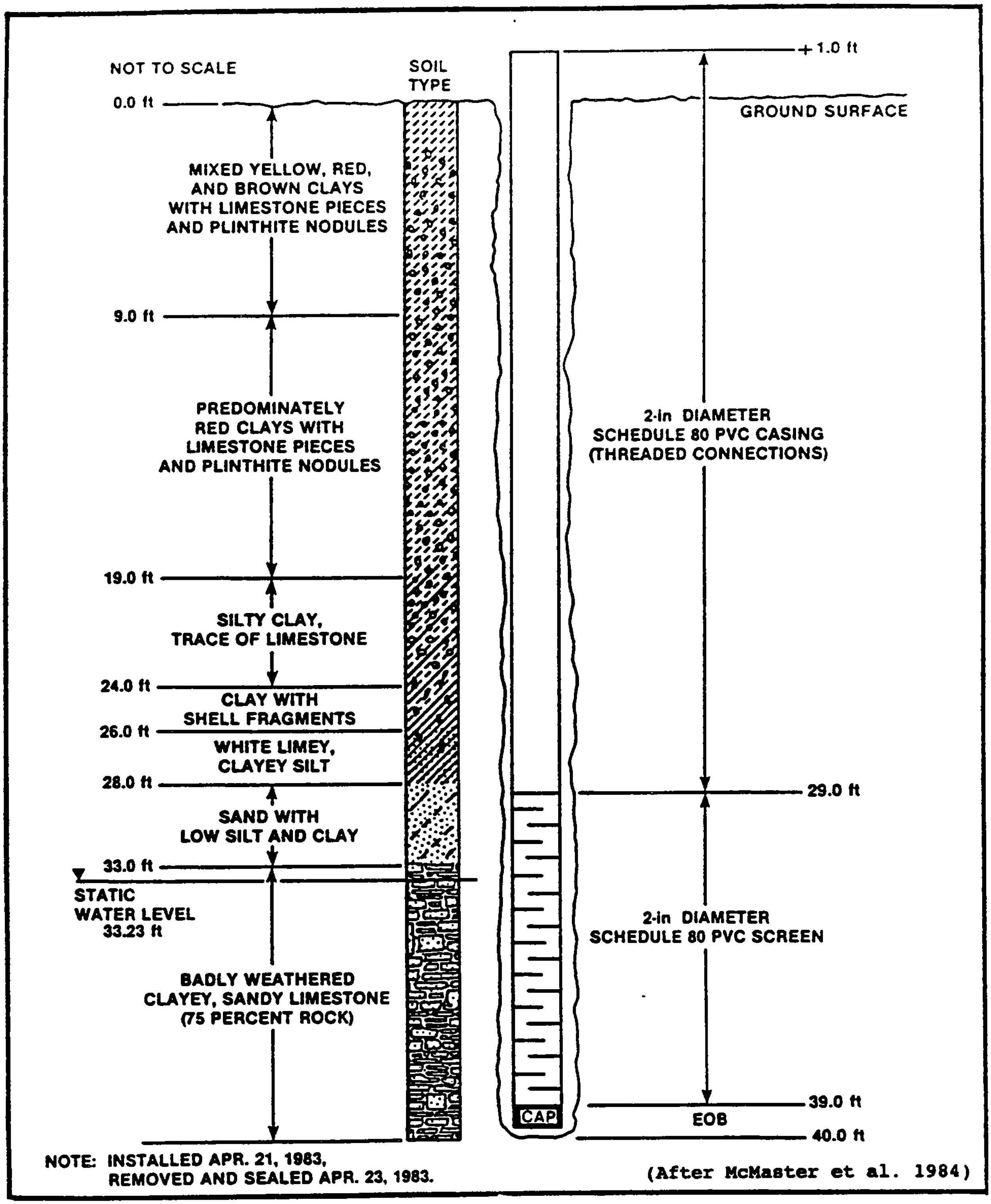


Figure 4. Log of deep soil boring DB-1

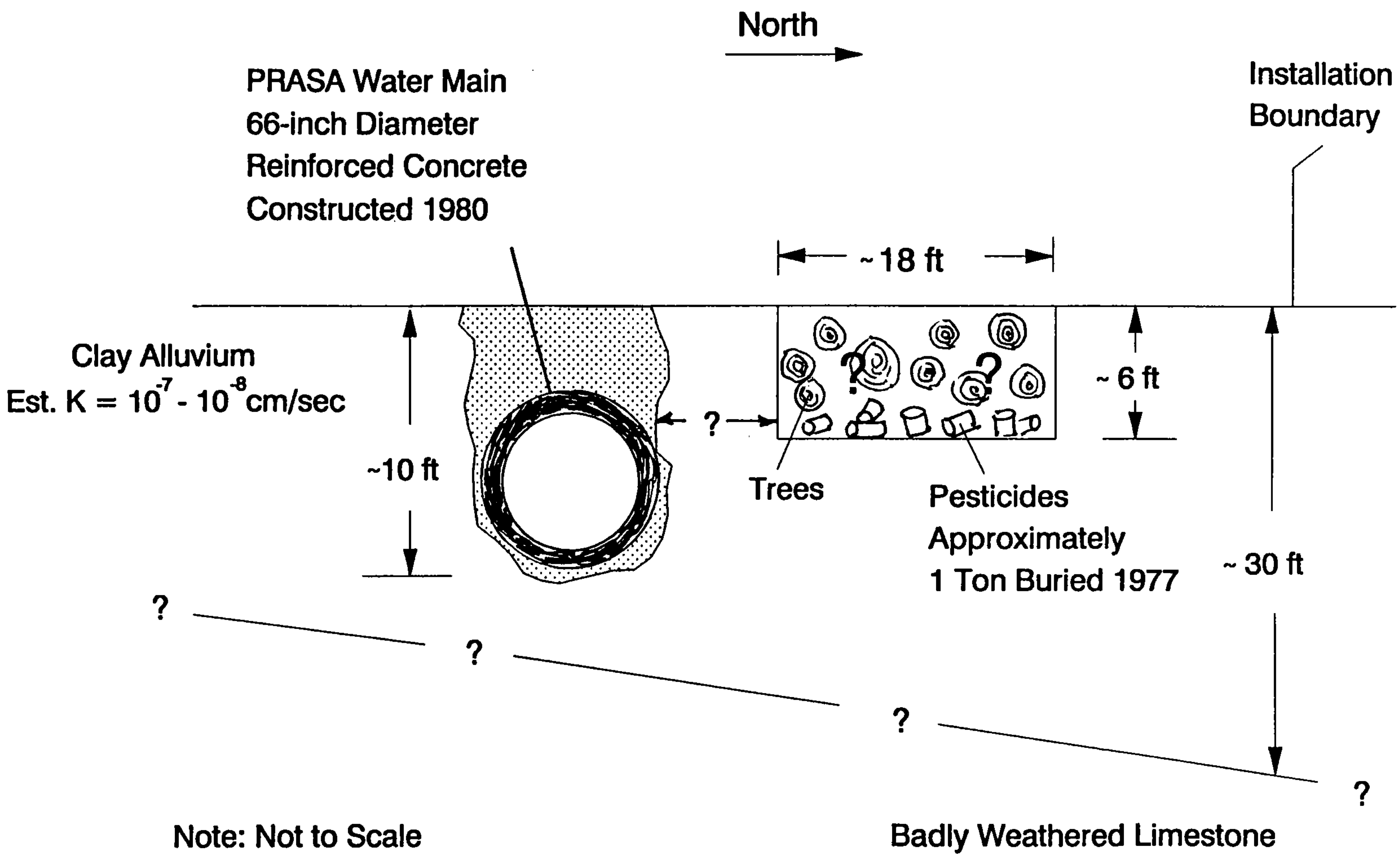
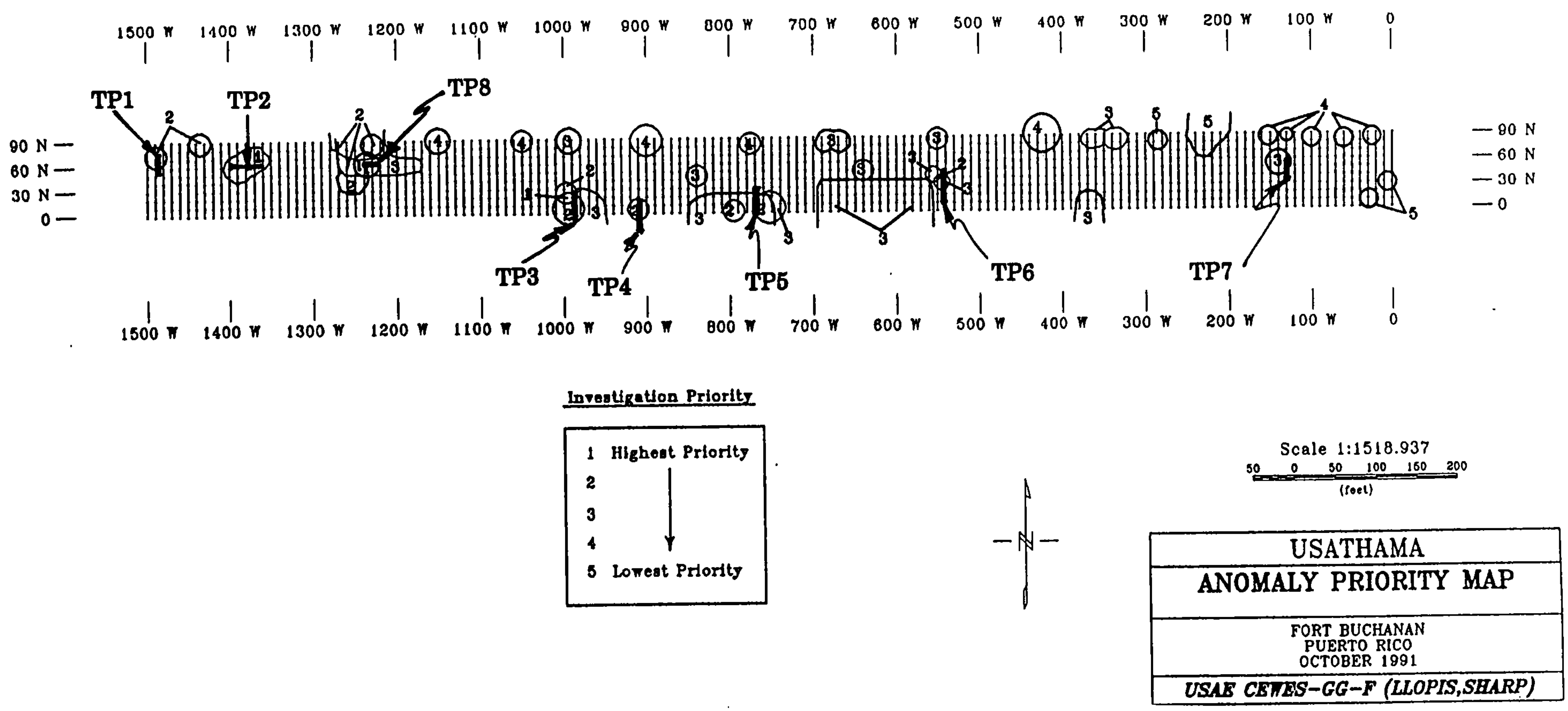


Figure 5. Schematic cross section of alleged pesticide burial area based on information in McMaster et al. 1984



(Adapted from Llopis, J. L. and Sharp, M. K., 1992)

Figure 6. Location of test pits relative to geophysical anomaly locations

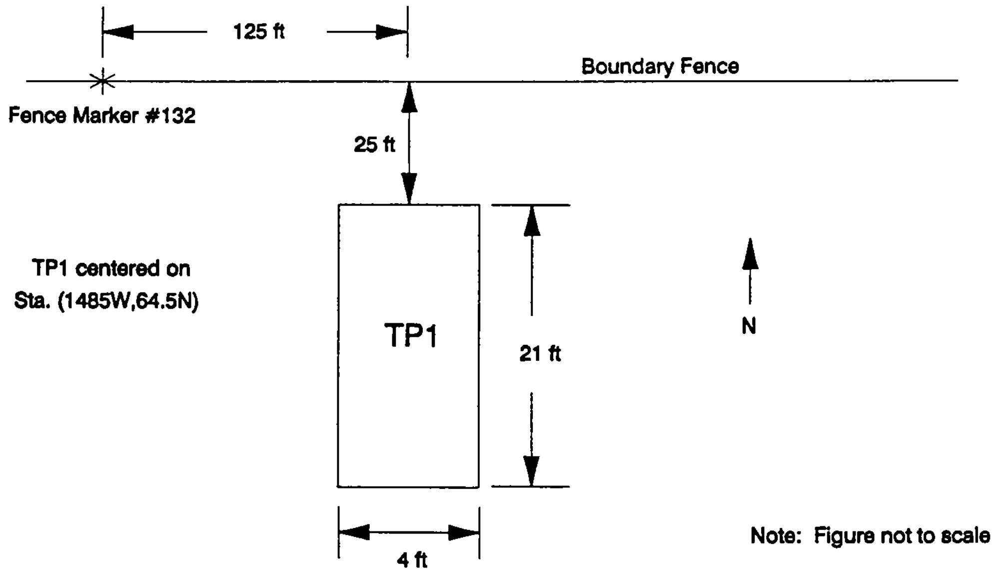


Figure 7a. Layout of test pit TP1

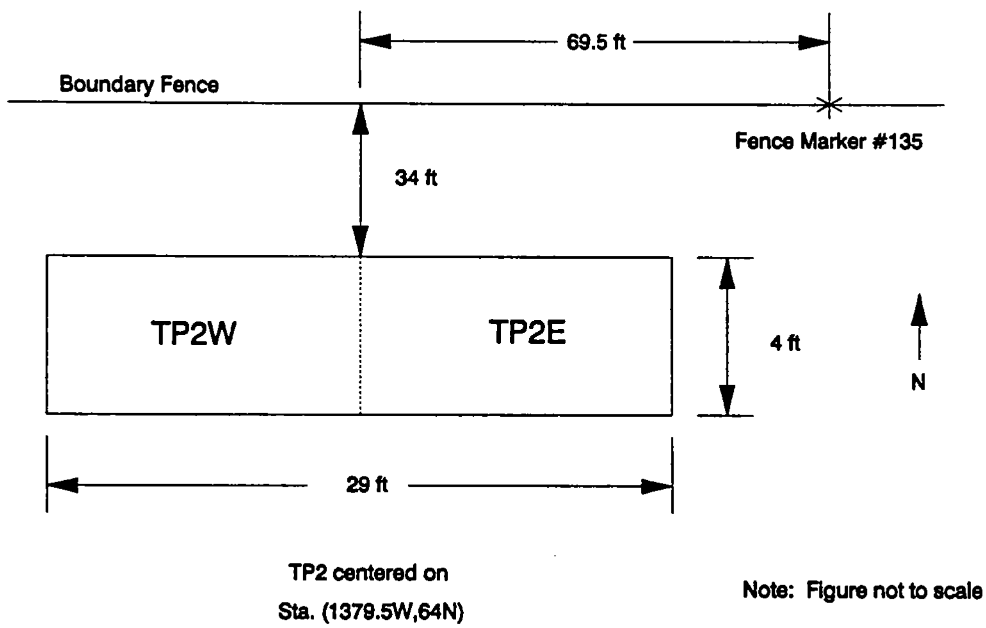


Figure 7b. Layout of test pit TP2

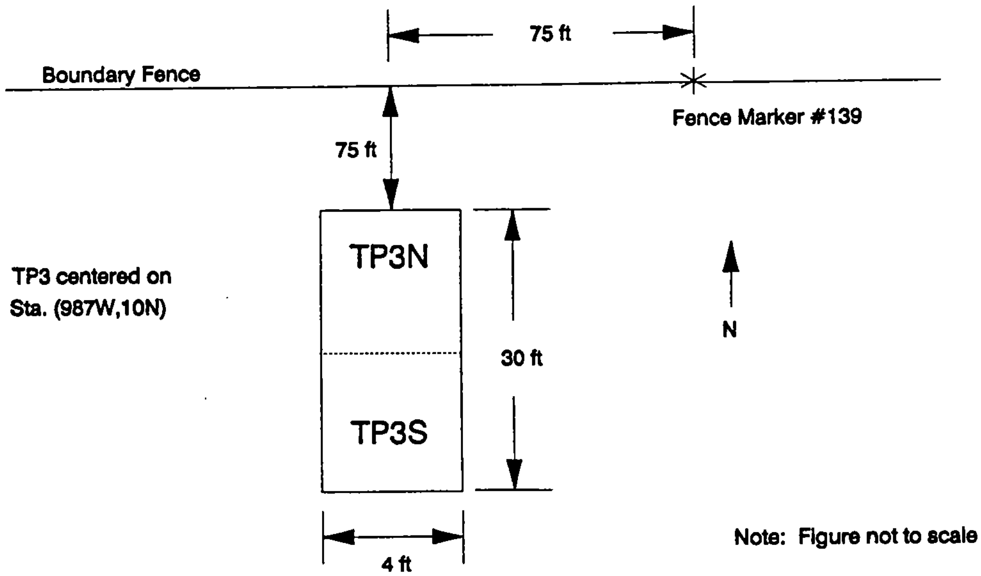


Figure 7c. Layout of test pit TP3

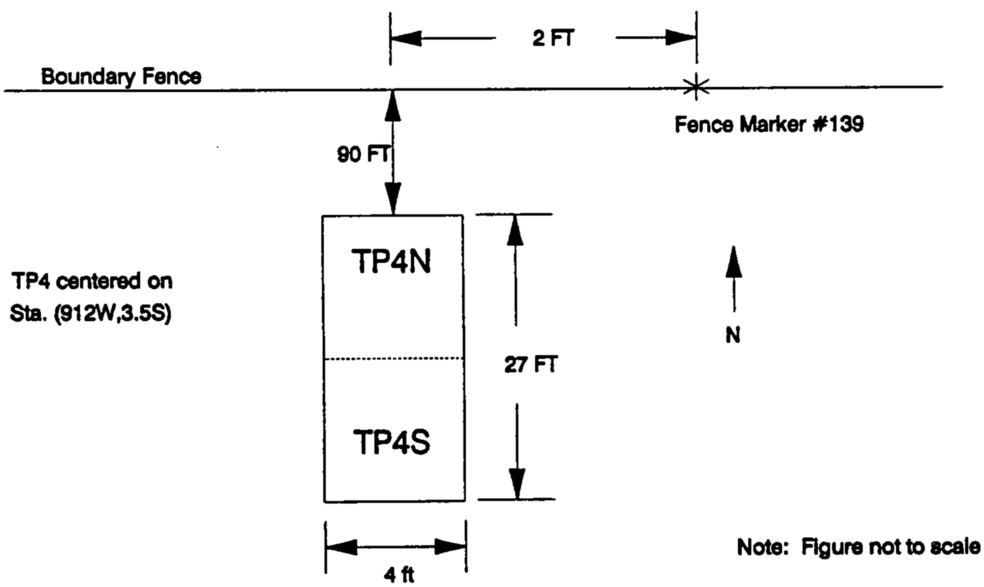


Figure 7d. Layout of test pit TP4

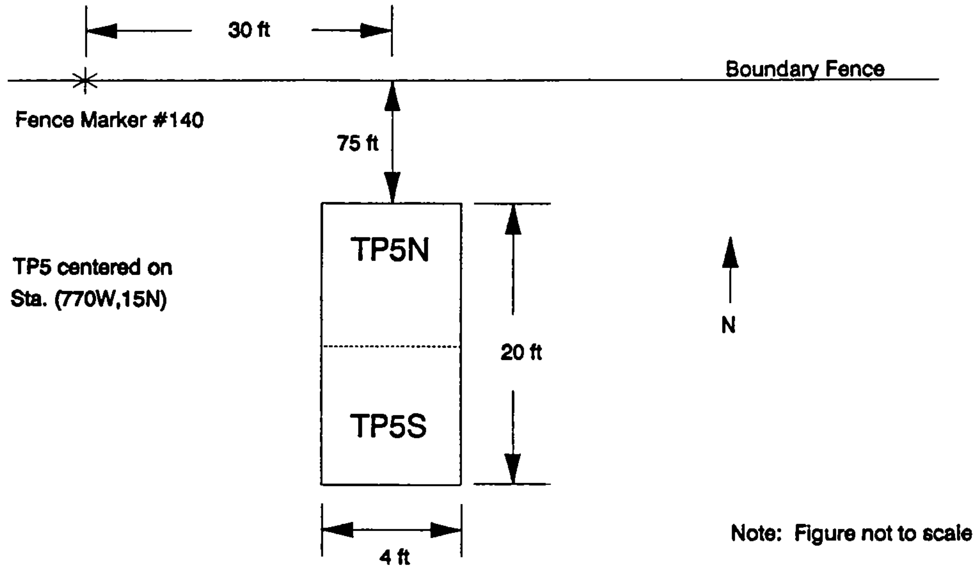


Figure 7e. Layout of test pit TP5

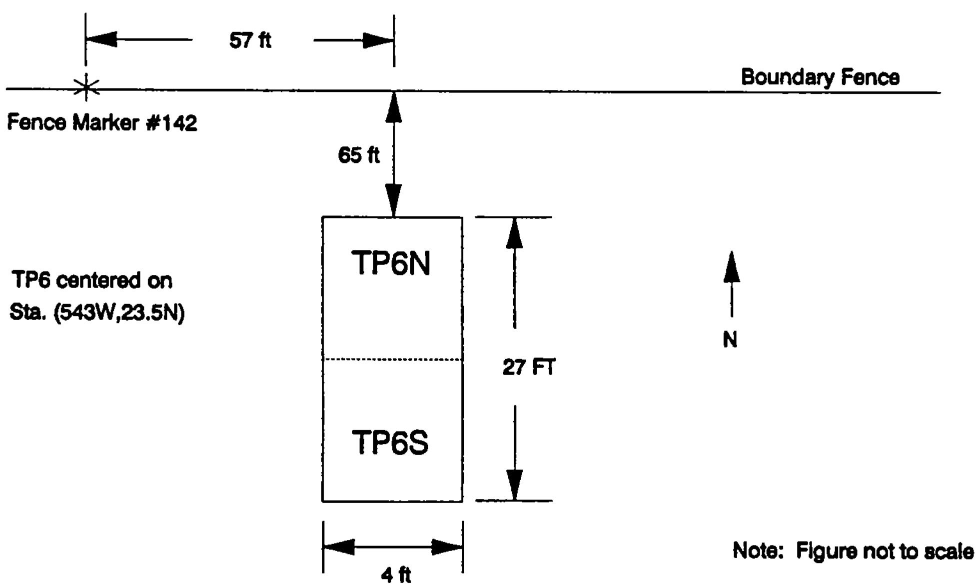


Figure 7f. Layout of test pit TP6

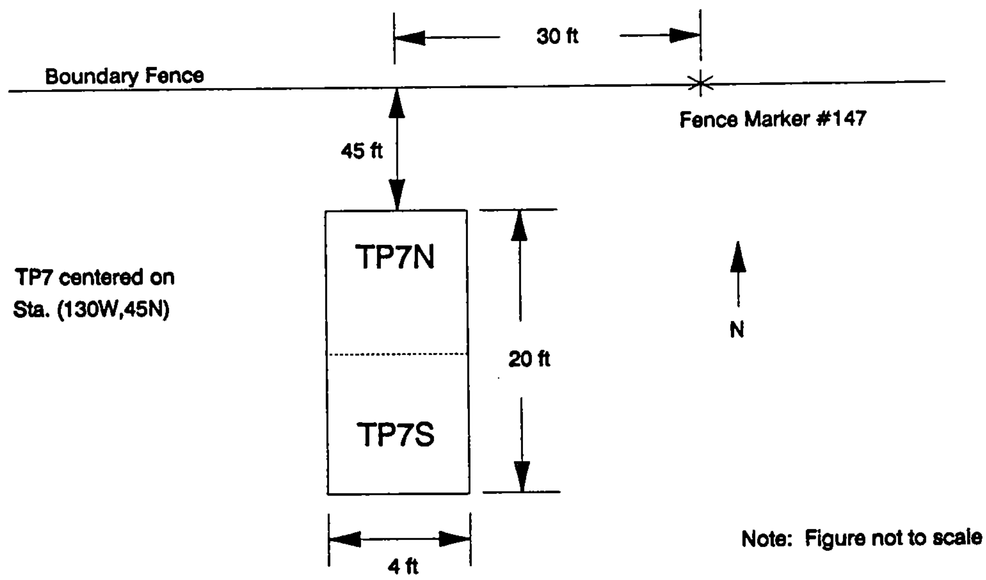


Figure 7g. Layout of test pit TP7

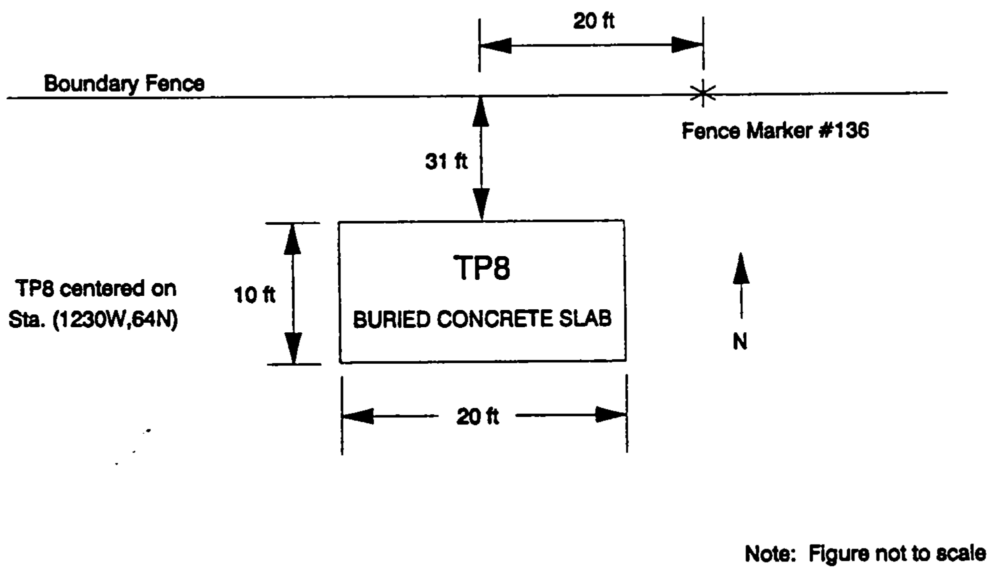


Figure 7h. Layout of test pit TP8

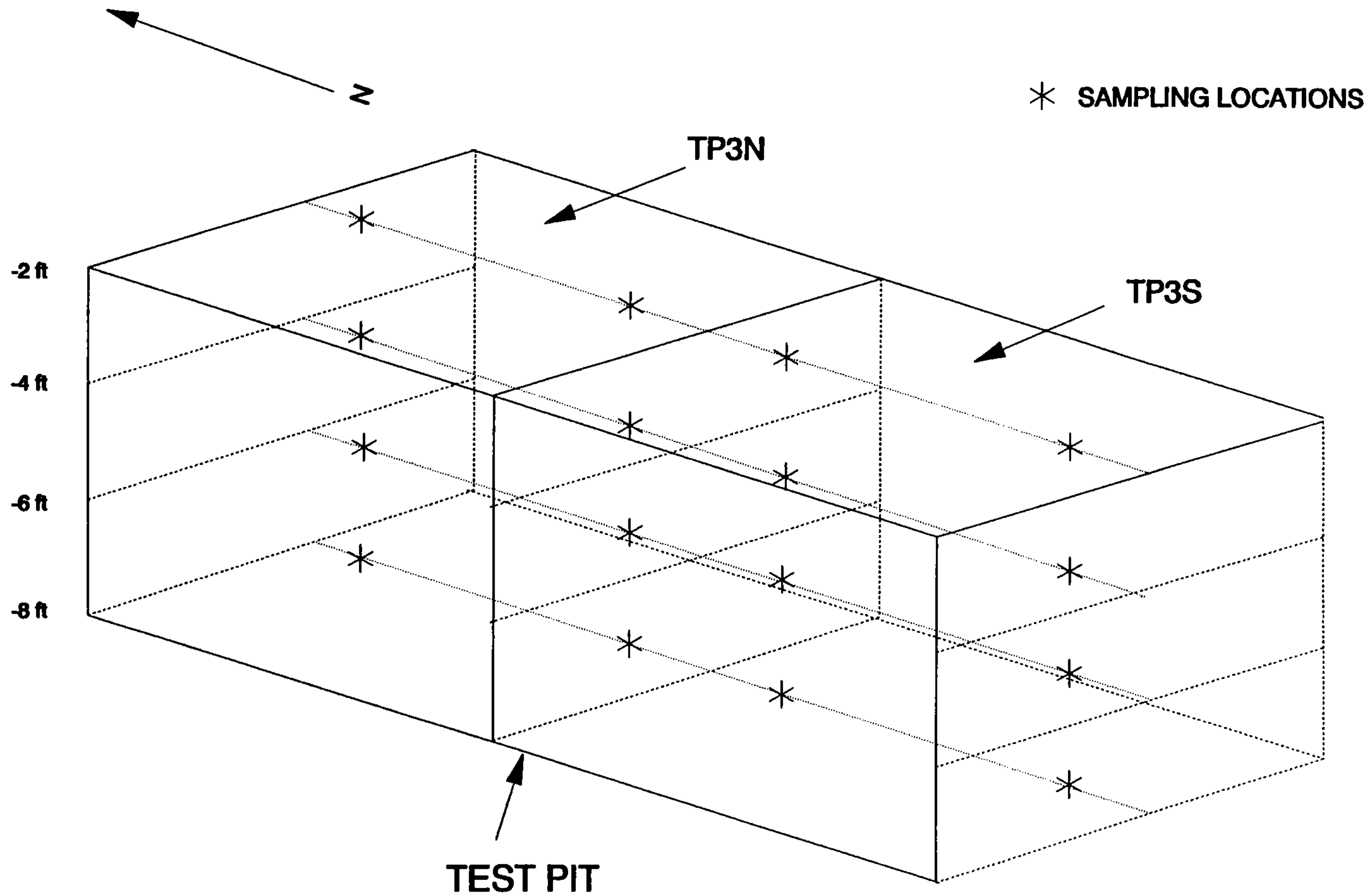
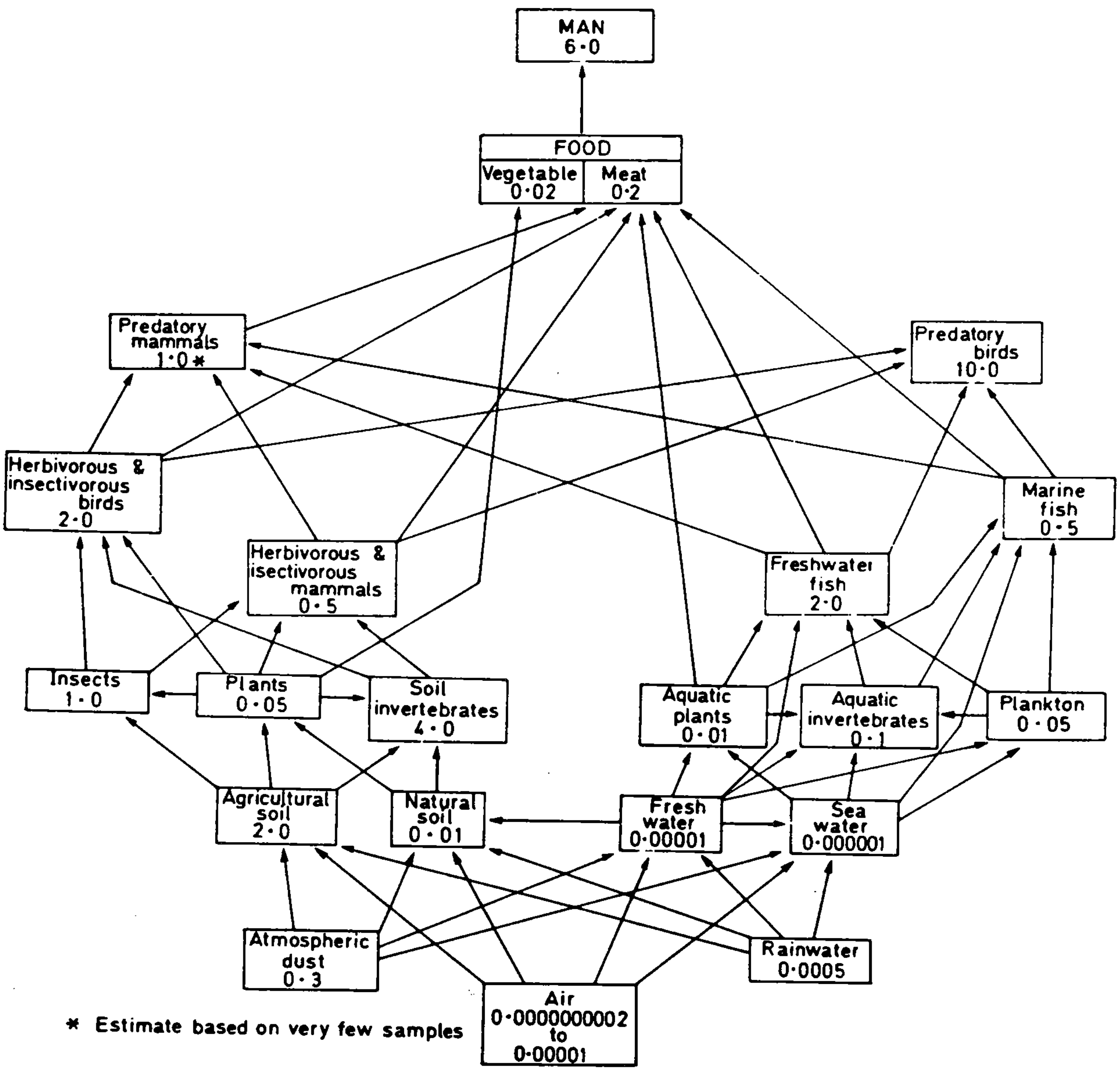


Figure 8. Sampling points within a typical test pit



(Adapted from Edwards, C. A., 1981)

Figure 9. Typical amounts of DDT (ppm) in the environment

APPENDIX A

SOIL LOGS

Fort Buchanan, Puerto Rico
Soil Logs

Test Pit TP1
20 October 1992

0 - 2 ft.	Plastic clay - intermixed crushed limestone.
2 - 4 ft.	Dark brown, stiff, plastic, clay.
4 - 6 ft.	Red, stiff, plastic, clay with some sand.
6 - 8 ft.	Black, gray, red, gravelly, plastic, clay with intermixed sand.

Test Pit TP2
20 October 1992

0 - 2 ft.	Dark brown, plastic, clay grading to reddish brown with depth.
2 - 6 ft.	Red and gray, plastic, clay with some sand.
6 - 8 ft.	Light gray, stiff, plastic, clay with sand (western end). Red, stiff, plastic, clay and fine gravel.

Test Pit TP3
20-22 October 1992

0 - 4 ft.	Brown, stiff, plastic, clay. Pieces of steel grates as used for foot walks encountered.
4 - 6 ft.	Brown, stiff, plastic, clay.
6 - 8 ft.	Light gray, clayey sand with little moisture.

Test Pit TP4

22 October 1992

0 - 4 ft.	Brown clay with black coal-like little (appr. 0.25 in. dia.) nodules (plinthite). Tree trunks observed in the upper 2 ft.
4 - 6 ft.	Light gray, stiff, plastic, clay with intermixed brown clay and black nodules (plinthite).
6 - 8 ft.	Gray, dry, highly weathered in-place limestone?

Test Pit TP5

22 October 1992

0 - 2 ft.	Dark brown, stiff, plastic, clay with plinthite nodules. Soil has mottled appearance.
2 - 4 ft.	Moist, stiff, plastic, reddish brown to reddish gray clay.
4 - 6 ft.	Steel gray, highly plastic, moist, stiff, clay overlying highly weathered limestone. Weathered material is tan with coarse grains.
6 - 8 ft.	Steel gray, stiff, plastic, clay intermixed with tan colored plastic clay and 0.25 in. dia. plinthite nodules.

Test Pit TP6

23 October 1992

0 - 2 ft.	Reddish brown, stiff, plastic, clay with plinthite nodules. Creosote treated board in the upper 1 ft.
2 - 4 ft.	Brown, plastic, clay. Little moisture, crumbly, and containing plinthite nodules.
4 - 6 ft.	Intermixed red, white, tan, very stiff, clay with plinthite nodules.
6 - 8 ft.	Light gray to tan, stiff, clay with intermixed reddish colored fine sand.

Test Pit TP7

23 October 1992

0 - 2 ft.	Light brown, low plasticity, clay. Low moisture and crumbly. Pieces of tree trunks encountered.
2 - 4 ft.	Reddish brown, dry, crumbly, clay with black plinthite nodules.
4 - 8 ft.	Reddish brown, stiff, highly plastic, clay with intermixed sand and black plinthite nodules.

APPENDIX B

REPORT OF ANALYSIS

23 NOV 1992
GB

REPORT OF ANALYSIS

U.S. ARMY ENVIRONMENTAL HYGIENE AGENCY
ORGANIC ENVIRONMENTAL CHEMISTRY DIVISION
PESTICIDE ANALYSIS BRANCH

INSTALLATION: FT. BUCHANAN, PR
PROJECT NUMBER: 37-58-JZ35
PROJECT OFFICER: BOWSER
DATE SAMPLES COLLECTED: 20-23 OCT 92
DATE SAMPLES RECEIVED: 23,26 OCT 92
SAMPLE TYPE: SOIL

SAMPLE SET#1 EXTRACTION DATE: 30 OCT-2 NOV 92
SAMPLE SET#2 EXTRACTION DATE: 2-3 NOV 92
SAMPLE ANALYSIS DATE: 8-17 NOV 92
QC NUMBERS: S2041, S2042, S2094, S2095, S2096

ANALYSIS REQUESTED: PESTICIDES AND POLYCHLORINATED BIPHENLYS
PROCEDURES PERFORMED: SAMPLE EXTRACTION AND ANALYSIS WAS PERFORMED USING AEHA/OECD/PAB SOP #31B.1-(ANALYSIS FOR ORGANOCHLORINE, ORGANOPHOSPHORUS, ORGANONITROGEN PESTICIDES AND POLYCHLORINATED BIPHENYLS IN SOIL USING A RAPID SONICATION METHOD).

AQAD NUMBER	FIELD NUMBER	SAMPLE RESULTS * ug/g (ppm)
B9898	TP1-2	ALL ANALYTES BELOW DETECTION LIMITS
B9899	TP1-4	ALL ANALYTES BELOW DETECTION LIMITS
B9900	TP1-6	ALL ANALYTES BELOW DETECTION LIMITS
B9901	TP1-8	ALL ANALYTES BELOW DETECTION LIMITS
B9902	TP2E-2	ALL ANALYTES BELOW DETECTION LIMITS
B9902 Duplicate	TP2E-2	ALL ANALYTES BELOW DETECTION LIMITS
B9903	TP2E-4	ALL ANALYTES BELOW DETECTION LIMITS
B9904	TP2E-6	ALL ANALYTES BELOW DETECTION LIMITS
B9905	TP2E-8	ALL ANALYTES BELOW DETECTION LIMITS
B9906	TP2W-2	ALL ANALYTES BELOW DETECTION LIMITS
B9907	TP2W-4	ALL ANALYTES BELOW DETECTION LIMITS
B9908	TP2W-6	ALL ANALYTES BELOW DETECTION LIMITS
B9909	TP2W-8	ALL ANALYTES BELOW DETECTION LIMITS

ALL REPORTED RESULTS ARE BASED ON SAMPLE DRY WEIGHT.
* See parameter list for target compounds and detection limits.

Robert Scarff
EXTRACTED BY: ROBERT SCARFF

Robert Scarff
ANALYST: ROBERT SCARFF

Kenneth Mioduski
REVIEWED BY: KENNETH MIODUSKI

DATE RESULTS REPORTED: 11/23/92

J. Howard Vinopal
APPROVED BY: J. HOWARD VINOPAL
CHIEF, PAB

REPORT OF ANALYSIS (CONT'D)

INSTALLATION: FT. BUCHANAN, PR
PROJECT NUMBER: 37-58-JZ35
PROJECT OFFICER: BOWSER
DATE SAMPLES COLLECTED: 20-23 OCT 92
DATE SAMPLES RECEIVED: 23,26 OCT 92
SAMPLE TYPE: SOIL

SAMPLE SET#1 EXTRACTION DATE: 30 OCT-2 NOV 92
SAMPLE SET#2 EXTRACTION DATE: 2-3 NOV 92
SAMPLE ANALYSIS DATE: 8-17 NOV 92
QC NUMBERS: S2041, S2042, S2094
S2095, S2096

ANALYSIS REQUESTED: PESTICIDES AND POLYCHLORINATED BIPHENLYS
PROCEDURES PERFORMED: SAMPLE EXTRACTION AND ANALYSIS WAS PERFORMED USING AEHA/OECD/PAB SOP #31B.1-(ANALYSIS FOR ORGANOCHLORINE, ORGANOPHOSPHORUS, ORGANONITROGEN PESTICIDES AND POLYCHLORINATED BIPHENYLS IN SOIL USING A RAPID SONICATION METHOD).

AQAD NUMBER	FIELD NUMBER	SAMPLE RESULTS * ug/g (ppm)	
B9910	TP3N-2	p,p'- DDE	0.26
		p,p'- DDD	0.33
		ALL OTHER ANALYTES BELOW DETECTION LIMITS	
B9911	TP3N-4	p,p'- DDD	0.40
		p,p'- DDT	1.64
		ALL OTHER ANALYTES BELOW DETECTION LIMITS	
B9912	TP3N-6	o,p'- DDD	0.28
		p,p'- DDD	0.23
		ALL OTHER ANALYTES BELOW DETECTION LIMITS	
B9913	TP3N-8	ALL ANALYTES BELOW DETECTION LIMITS	
B9914	TP3S-2	ALL ANALYTES BELOW DETECTION LIMITS	
B9915	TP3S-4	ALL ANALYTES BELOW DETECTION LIMITS	
B9916	TP3S-6	ALL ANALYTES BELOW DETECTION LIMITS	
B9917	TP3S-8	ALL ANALYTES BELOW DETECTION LIMITS	
B9918	TP4N-2	ALL ANALYTES BELOW DETECTION LIMITS	
B9919	TP4N-4	ALL ANALYTES BELOW DETECTION LIMITS	
B9920	TP4S-2	ALL ANALYTES BELOW DETECTION LIMITS	
QAD mtrx B9921 QUALITY CONTROL SAMPLE	TP5L-1	AROCLOR 1254	170
		alpha-BHC	0.24
		HEPTACHLOR	0.23

ALL REPORTED RESULTS ARE BASED ON SAMPLE DRY WEIGHT.
* See parameter list for target compounds and detection limits.

EXTRACTED BY: Robert Scarff ROBERT SCARFF

ANALYST: Robert Scarff ROBERT SCARFF

REVIEWED BY: Kenneth Miodusk KENNETH MIODUSKI

DATE RESULTS REPORTED: 11/24/92

APPROVED BY: J. Howard Vinopal J. HOWARD VINOPAL
CHIEF, PAB

REPORT OF ANALYSIS (CONT'D)

INSTALLATION: FT. BUCHANAN, PR
PROJECT NUMBER: 37-58-JZ35
PROJECT OFFICER: BOWSER
DATE SAMPLES COLLECTED: 20-23 OCT 92
DATE SAMPLES RECEIVED: 23,26 OCT 92
SAMPLE TYPE: SOIL

SAMPLE SET#1 EXTRACTION DATE: 30 OCT-2 NOV 92
SAMPLE SET#2 EXTRACTION DATE: 2-3 NOV 92
SAMPLE ANALYSIS DATE: 8-17 NOV 92
QC NUMBERS: S2041, S2042, S2094
S2095, S2096

ANALYSIS REQUESTED: PESTICIDES AND POLYCHLORINATED BIPHENLYS
PROCEDURES PERFORMED: SAMPLE EXTRACTION AND ANALYSIS WAS PERFORMED USING AEHA/OECD/PAB SOP #31B.1-(ANALYSIS FOR ORGANOCHLORINE, ORGANOPHOSPHORUS, ORGANONITROGEN PESTICIDES AND POLYCHLORINATED BIPHENYLS IN SOIL USING A RAPID SONICATION METHOD).

AQAD NUMBER	FIELD NUMBER	SAMPLE RESULTS * ug/g (ppm)	
14981 cont B9921 continued	TP5L-1 QUALITY CONTROL SAMPLE	ALDRIN	0.14
		HEPTACHLOR EPOXIDE	0.19
		DIELDRIN	0.22
		ENDRIN	0.22
		p,p'- DDT	0.26
		ALL OTHER ANALYTES BELOW DETECTION LIMITS	
B9922	TP4N-6	ALL ANALYTES BELOW DETECTION LIMITS	
B9923	TP4N-8	ALL ANALYTES BELOW DETECTION LIMITS	
B9924	TP4S-4	ALL ANALYTES BELOW DETECTION LIMITS	
B9924 Duplicate	TP4S-4	ALL ANALYTES BELOW DETECTION LIMITS	
B9925	TP4S-6	ALL ANALYTES BELOW DETECTION LIMITS	
B9926	TP4S-8	ALL ANALYTES BELOW DETECTION LIMITS	
B9927	TP5N-2	ALL ANALYTES BELOW DETECTION LIMITS	
B9928	TP5N-4	ALL ANALYTES BELOW DETECTION LIMITS	
B9929	TP5N-6	ALL ANALYTES BELOW DETECTION LIMITS	
B9930	TP5N-8	ALL ANALYTES BELOW DETECTION LIMITS	
B9931	TP5S-2	ALL ANALYTES BELOW DETECTION LIMITS	
B9932	TP5S-4	ALL ANALYTES BELOW DETECTION LIMITS	

ALL REPORTED RESULTS ARE BASED ON SAMPLE DRY WEIGHT.
* See parameter list for target compounds and detection limits.

EXTRACTED BY: Robert Scarff ROBERT SCARFF

ANALYST: Robert Scarff ROBERT SCARFF

REVIEWED BY: Kenneth Mioduski KENNETH MIODUSKI

DATE RESULTS REPORTED: 11/23/92

APPROVED BY: J. Howard Vinopal J. HOWARD VINOPAL
CHIEF, PAB

REPORT OF ANALYSIS (CONT'D)

INSTALLATION: FT. BUCHANAN, PR
PROJECT NUMBER: 37-58-JZ35
PROJECT OFFICER: BOWSER
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DATE SAMPLES RECEIVED: 23,26 OCT 92
SAMPLE TYPE: SOIL

SAMPLE SET#1 EXTRACTION DATE: 30 OCT-2 NOV 92
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SAMPLE ANALYSIS DATE: 8-17 NOV 92
QC NUMBERS: S2041, S2042, S2094
S2095, S2096

ANALYSIS REQUESTED: PESTICIDES AND POLYCHLORINATED BIPHENLYS
PROCEDURES PERFORMED: SAMPLE EXTRACTION AND ANALYSIS WAS PERFORMED USING AEHA/OECD/PAB SOP #31B.1-(ANALYSIS FOR ORGANOCHLORINE, ORGANOPHOSPHORUS, ORGANONITROGEN PESTICIDES AND POLYCHLORINATED BIPHENYLS IN SOIL USING A RAPID SONICATION METHOD).

AQAD NUMBER	FIELD NUMBER	SAMPLE RESULTS * ug/g (ppm)
B9933	TP5S-6	ALL ANALYTES BELOW DETECTION LIMITS
B9934	TP5S-8	ALL ANALYTES BELOW DETECTION LIMITS
B9935	TP6N-2	ALL ANALYTES BELOW DETECTION LIMITS
B9936	TP6N-4	ALL ANALYTES BELOW DETECTION LIMITS
B9936 Duplicate	TP6N-4	ALL ANALYTES BELOW DETECTION LIMITS
B9937	TP6N-6	ALL ANALYTES BELOW DETECTION LIMITS
B9938	TP6N-8	ALL ANALYTES BELOW DETECTION LIMITS
B9939	TP6S-2	ALL ANALYTES BELOW DETECTION LIMITS
B9940	TP6S-4	ALL ANALYTES BELOW DETECTION LIMITS
B9941	TP6S-6	ALL ANALYTES BELOW DETECTION LIMITS
B9942	TP6S-8	ALL ANALYTES BELOW DETECTION LIMITS
B9943	TP7N-2	ALL ANALYTES BELOW DETECTION LIMITS
B9944	TP7N-4	ALL ANALYTES BELOW DETECTION LIMITS
B9945	TP7N-6	ALL ANALYTES BELOW DETECTION LIMITS
B9946	TP7N-8	ALL ANALYTES BELOW DETECTION LIMITS

ALL REPORTED RESULTS ARE BASED ON SAMPLE DRY WEIGHT.
* See parameter list for target compounds and detection limits.

EXTRACTED BY: Robert Scarff ROBERT SCARFF

ANALYST: Robert Scarff ROBERT SCARFF

REVIEWED BY: KENNETH MIODUSKI

DATE RESULTS REPORTED: 11/23/92

APPROVED BY: J. HOWARD VINOPAL
CHIEF, PAB

REPORT OF ANALYSIS (CONT'D)

INSTALLATION: FT. BUCHANAN, PR
PROJECT NUMBER: 37-58-JZ35
PROJECT OFFICER: BOWSER
DATE SAMPLES COLLECTED: 20-23 OCT 92
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S2095, S2096

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AQAD NUMBER	FIELD NUMBER	SAMPLE RESULTS * ug/g (ppm)
B9947	TP7S-2	ALL ANALYTES BELOW DETECTION LIMITS
B9948	TP7S-4	ALL ANALYTES BELOW DETECTION LIMITS
B9949	TP7S-6	ALL ANALYTES BELOW DETECTION LIMITS
B9950	TP7S-8	ALL ANALYTES BELOW DETECTION LIMITS

ALL REPORTED RESULTS ARE BASED ON SAMPLE DRY WEIGHT.
* See parameter list for target compounds and detection limits.

EXTRACTED BY: Robert Scarff ROBERT SCARFF

ANALYST: Robert Scarff ROBERT SCARFF

REVIEWED BY: Kenneth Mioduski KENNETH MIODUSKI

DATE RESULTS REPORTED: 11/23/92

APPROVED BY: J. Howard Vinopal J. HOWARD VINOPAL
CHIEF, PAB

QUALITY CONTROL DATA

QC NUMBER: S2041
QC TYPE: ORGANOCHLORINE, ORGANOPHOSPHORUS AND ORGANONITROGEN PESTICIDES
QC MATRIX: SOIL

SAMPLE SET#1: B9898-B9930
QC EXTRACTION DATE: 30 OCT-2 NOV 92
QC ANALYSIS DATE: 8-9 NOV 92

COMPOUNDS SPIKED	CONCENTRATION SPIKED ug/g (ppm)	CONCENTRATION RECOVERED ug/g (ppm)	PERCENT RECOVERY(%)	PAB ACCEPTANCE CONTROL LIMITS ug/g (ppm)
LINDANE	0.53	0.54	102	0.34-0.72
ENDRIN	0.13	0.13	100	0.08-0.18
BROMACIL	0.80	0.78	98	0.51-1.09
ALACHLOR	0.67	0.84	125	0.43-0.91
o,p'- DDE	0.80	0.76	95	0.51-1.09
PARATHION	0.33	0.41	124	0.21-0.45
CHLORONEB	0.67	0.64	96	0.43-0.91
OXADIAZON	0.53	0.55	104	0.34-0.72

EXTRACTED BY: ROBERT SCARFF

ANALYST: ROBERT SCARFF

REVIEWED BY: KENNETH MIODUSKI

DATE RESULTS REPORTED: 11/23/92

APPROVED BY: J. HOWARD VINOPAL
CHIEF, PAB

QUALITY CONTROL DATA

QC NUMBER: S2094
QC TYPE: POLYCHLORINATED BIPHENYLS
QC MATRIX: SOIL

SAMPLE SET#1: B9898-B9930
QC EXTRACTION DATE: 30 OCT-2 NOV 92
QC ANALYSIS DATE: 8-9 NOV 92

COMPOUNDS SPIKED	CONCENTRATION SPIKED ug/g (ppm)	CONCENTRATION RECOVERED ug/g (ppm)	PERCENT RECOVERY(%)	PAB ACCEPTANCE CONTROL LIMITS ug/g (ppm)
(AROCLOR 1221)	2.00	1.89	95	1.28-2.72
(AROCLOR 1254)	4.00	3.50	88	2.56-5.44

EXTRACTED BY: Robert Scarff ROBERT SCARFF

ANALYST: Robert Scarff ROBERT SCARFF

REVIEWED BY: Kenneth Mioduski KENNETH MIODUSKI

DATE RESULTS REPORTED: 11/23/92

APPROVED BY: J. Howard Vinopal J. HOWARD VINOPAL
CHIEF, PAB

MATRIX SPIKE DATA

MATRIX NUMBER: B9904MS (Spiked with PEST QC#S2041)
MATRIX TYPE: ORGANOCHLORINE, ORGANOPHOSPHORUS AND ORGANONITROGEN PESTICIDES
SPIKE MATRIX: SOIL

SAMPLE SET#1: B9898-B9930
QC EXTRACTION DATE: 30 OCT-2 NOV 92
QC ANALYSIS DATE: 8-9 NOV 92

COMPOUNDS SPIKED	CONCENTRATION SPIKED ug/g (ppm)	CONCENTRATION RECOVERED ug/g (ppm)	PERCENT RECOVERY(%)	PAB ACCEPTANCE CONTROL LIMITS ug/g (ppm)
LINDANE	0.53	0.45	85	0.34-0.72
ENDRIN	0.13	0.13	100	0.08-0.18
BROMACIL	0.80	0.73	91	0.51-1.09
ALACHLOR	0.67	0.87	130	0.43-0.91
o,p'- DDE	0.80	0.72	90	0.51-1.09
PARATHION	0.33	0.36	109	0.21-0.45
CHLORONEB	0.67	0.52	78	0.43-0.91
OXADIAZON	0.53	0.59	111	0.34-0.72

Robert Scarff
EXTRACTED BY: ROBERT SCARFF

Robert Scarff
ANALYST: ROBERT SCARFF

Kenneth Miodusk
REVIEWED BY: KENNETH MIODUSKI

DATE RESULTS REPORTED: 11/23/92

J. Howard Vinopal
APPROVED BY: J. HOWARD VINOPAL
CHIEF, PAB

MATRIX SPIKE DATA

MATRIX NUMBER: B9920MS (Spiked with PCB QC#S2095)
MATRIX TYPE: POLYCHLORINATED BIPHENYLS
SPIKE MATRIX: SOIL

SAMPLE SET#1: B9898-B9930
MATRIX SPIKE EXTRACTION DATE: 30 OCT-2 NOV 92
MATRIX SPIKE ANALYSIS DATE: 8-9 NOV 92

COMPOUNDS SPIKED	CONCENTRATION SPIKED ug/g (ppm)	CONCENTRATION RECOVERED ug/g (ppm)	PERCENT RECOVERY(%)	PAB ACCEPTANCE CONTROL LIMITS ug/g (ppm)
(AROCLOR 1221)	2.00	1.58	79	1.28-2.72
(AROCLOR 1254)	4.00	4.82	121	2.56-5.44

EXTRACTED BY: ROBERT SCARFF Robert Scarff

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DATE RESULTS REPORTED: 11/23/92

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QUALITY CONTROL DATA

QC NUMBER: S2042
QC TYPE: ORGANOCHLORINE, ORGANOPHOSPHORUS AND ORGANONITROGEN PESTICIDES
QC MATRIX: SOIL

SAMPLE SET#2: B9931-B9950
QC EXTRACTION DATE: 2-3 NOV 92
QC ANALYSIS DATE: 8-9 NOV 92

COMPOUNDS SPIKED	CONCENTRATION SPIKED ug/g (ppm)	CONCENTRATION RECOVERED ug/g (ppm)	PERCENT RECOVERY (%)	PAB ACCEPTANCE CONTROL LIMITS ug/g (ppm)
LINDANE	0.53	0.54	102	0.34-0.72
ENDRIN	0.13	0.14	108	0.08-0.18
BROMACIL	0.80	0.67	84	0.51-1.09
ALACHLOR	0.67	0.84	125	0.43-0.91
o,p'- DDE	0.80	0.80	100	0.51-1.09
PARATHION	0.33	0.42	127	0.21-0.45
CHLORONEB	0.67	0.67	100	0.43-0.91
OXADIAZON	0.53	0.58	109	0.34-0.72

EXTRACTED BY: ROBERT SCARFF

ANALYST: ROBERT SCARFF

REVIEWED BY: KENNETH MIODUSKI

DATE RESULTS REPORTED: 11/23/92

APPROVED BY: J. HOWARD VINOPAL
CHIEF, PAB

MATRIX SPIKE DATA

MATRIX NUMBER: B9947MS (Spiked with PCB QC#S2096)
MATRIX TYPE: POLYCHLORINATED BIPHENYLS
SPIKE MATRIX: SOIL

SAMPLE SET#2: B9931-B9950
MATRIX SPIKE EXTRACTION DATE: 2-3 NOV 92
MATRIX SPIKE ANALYSIS DATE: 8-9 NOV 92

COMPOUNDS SPIKED	CONCENTRATION SPIKED ug/g (ppm)	CONCENTRATION RECOVERED ug/g (ppm)	PERCENT RECOVERY(%)	PAB ACCEPTANCE CONTROL LIMITS ug/g (ppm)
(AROCLOR 1221)	2.00	1.74	87	1.28-2.72
(AROCLOR 1254)	4.00	5.11	128	2.56-5.44

EXTRACTED BY: Robert Scarff ROBERT SCARFF

ANALYST: Robert Scarff ROBERT SCARFF

REVIEWED BY: Kenneth Miodusk KENNETH MIODUSKI

DATE RESULTS REPORTED: 11/23/92

APPROVED BY: J. Howard Vinopal J. HOWARD VINOPAL
CHIEF, PAB

PROGRAM 17 TARGET COMPOUNDS

REPORTING LIMITS FOR PRIMARY PESTICIDES, PESTICIDE METABOLITES, AND PCB's ANALYZED FOR IN SOIL AND SEDIMENT SAMPLES

COMPOUND	REPORTING LIMITS (ppm)
HCB	0.03
alpha-BHC	0.03
beta-BHC	0.10
delta-BHC	0.10
gamma-BHC (LINDANE)	0.04
o,p'-DDE	0.16
p,p'-DDE	0.16
o,p'-DDD	0.16
p,p'-DDD	0.16
o,p'-DDT	0.20
p,p'-DDT	0.30
ALDRIN	0.08
DIELDRIN	0.08
ENDRIN	0.08
CHLORDANE, METAOLIZED	0.30*
CHLORDANE, TECHNICAL	0.60
trans-CHLORDANE	0.08
cis-CHLORDANE	0.08
trans-NONACHLOR	0.08
OXYCHLORDANE	0.08
gamma-CHLORDENE	0.08
1-HYDROXYCHLORDENE	0.08
HEPTACHLOR	0.03
HEPTACHLOR EPOXIDE	0.08
ENDOSULFAN I	0.08
ENDOSULFAN II	0.10
ENDOSULFAN SULFATE	0.20
METHOXYCHLOR	0.80
MIREX	0.20
TOXAPHENE	4.00
PCB (AROCLOR 1016)	2.00
PCB (AROCLOR 1221)	2.00
PCB (AROCLOR 1232)	2.00
PCB (AROCLOR 1242)	2.00
PCB (AROCLOR 1248)	2.00
PCB (AROCLOR 1254)	2.00
PCB (AROCLOR 1260)	2.00
DIAZINON	0.10
PARATHION, METHYL	0.10
PARATHION, ETHYL	0.10
MALATHION	0.10
CHLORPYRIFOS	0.10
RONNEL	0.10
SULFOTEPP	0.10
PROPETAMPHOS	0.10
FONOPHOS	0.10
FENITROTHION	0.10
DICHLOFENTHION	0.10
ISOPHENPHOS	0.10
PHOSALONE	0.30
DISULFOTON	0.20
FENTHION	0.20

* METABOLIZED CHLORDANE IS CALCULATED BY SUMMING THE CHLORDANE COMPONENTS. ANY OR ALL OF THE FOLLOWING COMPOUNDS MAY BE PRESENT: HEPTACHLOR, HEPTACHLOR EPOXIDE, gamma-CHLORDENE, trans-CHLORDANE, cis-CHLORDANE, trans-NONACHLOR, OXYCHLORDANE AND 1-HDROXYCHLORDENE.

PROGRAM 17 TARGET COMPOUNDS (CONT'D)

COMPOUND	REPORTING LIMITS (ppm)
BROMACIL	0.20
ATRAZINE	1.00
SIMAZINE	1.00
PROPAZINE	1.00
DACTHAL	0.08
OXADIAZON	0.08
TRIADIMEFON (BAYLETON)	0.40
VINCLOZALIN	0.10
FLUCHLORALIN	0.10
ETRIDIAZOLE (ETHAZOL)	0.10
TRIFLURALIN	0.10
BENEFIN	0.10
CAPTAFOL	0.50
CHLOROTHALONIL	0.30
CAPTAN	0.50
CHLORONEB	0.20
PCNB	0.10
PRONAMIDE	0.20
ALACHLOR	0.30
DICHLORAN	0.10
FOLPET	0.50
ASPON	0.10
BENSULIDE	0.50
PROCYMIDONE	0.20
IPRODIONE	0.50

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13. ABSTRACT *(Maximum 200 words)*

Results of a soil sampling program at Solid Waste Management Unit No. 3 (SWMU No. 3) at Fort Buchanan, Puerto Rico (FTB), are presented. In 1977, approximately 1 ton (1 truckload) of various pesticides reportedly were buried at SWMU No. 3. The precise location of the burial trench is not available from records. The suspected burial trench lies in the vicinity of a 66-in. diameter water main which supplies the city of San Juan with potable water. There is concern over the possibility of pesticide-contaminated groundwater infiltrating through the line's seals when the line is depressurized during periodic maintenance. Investigations at this site have been ongoing since 1983 and include groundwater monitoring, soil trenching and sampling, and geophysical testing.

In an effort to determine the location of this trench, 52 soil samples were collected from 7 test pits and analyzed for the presence of pesticides. Test pit locations were selected based on the results of a previously

(Continued)

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conducted geophysical investigation. The results of the chemical analysis indicated tract amount of the pesticides p,p'-DDE, p,p'-DDD, p,p'-DDT, and o,p'-DDD in only one end of one test pit. These pesticide levels are not considered to be indicative of the levels expected to be associated with a pesticide disposal site but rather more indicative of amounts expected from routine pest control use. Based on visual observations during the excavation of the test pits and the results of the soil chemical analysis there is no indication of the presence of a pesticide disposal trench.

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY - REGION II
290 BROADWAY
NEW YORK, NEW YORK 10007-1866

JUL 14 1995

CERTIFIED MAIL
RETURN RECEIPT REQUESTED

Thomas L. Oetjen
Lieutenant Colonel, U.S. Army
Deputy Installation Commander
Department of the Army
Headquarters, Fort Buchanan
Fort Buchanan, Puerto Rico 00934-5000

Re: Determination on "Soil Sampling Program at Solid Waste Management Unit #3 (SWMU) at Fort Buchanan, Puerto Rico--Final Report"/U.S. Army, Ft. Buchanan, EPA I.D. #PRD121009999

Dear Colonel Oetjen:

The U.S. Environmental Protection Agency (EPA) has reviewed the report, "Soil Sampling Program at Solid Waste Management Unit #3, Fort Buchanan, Puerto Rico--Final Report (February 1993)". EPA accepts the findings in that report and recommends no further action concerning the rumored pesticide disposal area (Unit #3). However, if additional information becomes available through the Environmental Baseline Survey (EBS), expected to be planned during the next six months, or any other means relative to SWMU #3, other SWMUs or areas of concerns, an order may need to be negotiated to address additional investigation or remediation.

If you have any question on this matter, please contact Clifford Ng at (212) 637-4173.

Sincerely yours,

Barry Tornick for A.B.
Andrew Bellina, P.E.
Chief, Hazardous Waste Facilities Branch

cc: Angel Perez, Fort Buchanan
Carl-Axel Soderberg, EPA-CFO
Israel Torres, PREQB

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FINAL

U.S. ARMY BASE REALIGNMENT AND CLOSURE 95 PROGRAM

Environmental Baseline Survey Report

Fort Buchanan, Puerto Rico

Prepared for
U.S. Army Corps of Engineers
Jacksonville District
Seattle District

January 28, 1997

Woodward-Clyde

Woodward-Clyde Federal Services
4582 S. Ulster Street
Stanford Place 3, Suite 1200
Denver, Colorado 80237

Contract No. DACA67-95-D-1001

EXECUTIVE SUMMARY

Fort Buchanan, located in San Juan, Puerto Rico, has been selected for realignment under the 1995 Base Realignment and Closure (BRAC) process. The purpose of this Environmental Baseline Survey (EBS) is to classify discrete areas of real property on Fort Buchanan, which are subject to transfer or lease, into one of the seven standard environmental condition of property area types as defined by Community Environmental Response Facilitation Act (CERFA) guidance and the Department of Defense (DOD) BRAC *Cleanup Plan (BCP) Guidebook* (DOD 1993). This is achieved by identifying, characterizing, and documenting the obviousness of the presence or likely presence of a release or threatened release of hazardous substances or petroleum products associated with the historical and current use of Fort Buchanan. Releases at properties adjacent to Fort Buchanan that could affect the environmental condition of the installation property are also identified, characterized, and documented. Additionally, qualifiers have been placed on areas containing or suspected of containing non-Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) contamination substances (e.g., asbestos-containing material, lead-based paint) that may affect, limit, or preclude the transfer or lease of the property for unrestricted use.

The seven standard environmental condition of property area types (categories) are presented in Section 1.3. Areas that are designated as Category 1, 2, 3, or 4 are suitable for transfer or lease, subject to consideration of the qualifiers. Areas that are designated as Category 5, 6, or 7 are not suitable for transfer.

The real property evaluated under this investigation of Fort Buchanan consists of 18 geographic areas that together encompass approximately 746 acres; however, only approximately 80 acres were identified as being subject to transfer or lease. The 80 acres consist of four housing areas located on the southern portion of Fort Buchanan. The remaining property will be retained by the U.S. Army.

Fort Buchanan was established in 1923 and served as a training area for the 65th Infantry Regiment. From 1926 to 1939, Fort Buchanan was used as a maneuver area for Regular Army and National Guard Troops and also as a Citizen's Military Training Camp. From May 1, 1940 to August 23, 1966, Fort Buchanan was home to the Antilles Command and served as a supply depot, an induction center, and a training area. From August 1966 to December 1971, Fort Buchanan was deactivated and the land became the Naval Supply Annex San Juan. On July 1, 1973, Fort Buchanan was reassigned to the U.S. Army Forces Command (FORSCOM) and, as a result of closure studies conducted in 1976, it became a sub-installation of Fort McPherson, Georgia in October 1977 (U.S. Army Corps of Engineers 1991a; Environmental Science and Engineering, Inc. 1984). Since 1977, Fort Buchanan has provided administrative and logistical support to active duty and reserve components in Puerto Rico and the U.S. Virgin Islands. Support functions include planning and preparation for mobilization and deployment of Reserve Component Forces in Puerto Rico and the U.S. Virgin Islands; and the planning, coordination, and execution of all U.S. Army-related anti-terrorism counter actions on the island (Harland Barthelomew & Associates, Inc. 1994).

To prepare the EBS report, Woodward-Clyde reviewed existing installation documents; federal, commonwealth, and local government records; and aerial photographs. A site visit was conducted that included visual inspections of the property and surrounding properties, and employee interviews. Additionally, reasonably obtainable federal, commonwealth, and local government records for adjacent properties were reviewed. No sampling activities were associated with this EBS.

The information provided in this Final EBS Report is current as of February 1996; however, comments received from installation personnel and the regulatory community on the Draft and Draft Final EBS Reports have been incorporated, as appropriate.

The survey and parcelization of Fort Buchanan identified five BRAC parcels based on the environmental condition of the property. Table 5-1a and Figure 5-1 present the BRAC parcels and corresponding categorizations. Of the approximately 78.69 acres identified for transfer or lease, approximately 77.79 acres are designated as Categories 1 through 4, as shown in the BRAC Acreage Summary Table. Approximately 0.90 acres of BRAC property is designated as Category 7. Additionally, 9.27 acres of the categorized parcels were designated qualified for asbestos-containing material (ACM) and lead-based paint (LBP). Table 5-1b and Figure 5-1 present the qualified parcels.

BRAC ACREAGE SUMMARY TABLE
FORT BUCHANAN, PUERTO RICO

ENVIRONMENTAL CONDITION CATEGORY NUMBER	TOTAL ACREAGE	ACREAGE MINUS QUALIFIED AREAS	TOTAL QUALIFIED ACREAGE	ACM-QUALIFIED ACREAGE	LBP-QUALIFIED ACREAGE
1	77.79	68.52	9.27	3.15	9.27
2	0	0	0	0	0
3	0	0	0	0	0
4	0	0	0	0	0
5	0	0	0	0	0
6	0	0	0	0	0
7	0.90	0.90	0	0	0
Total	78.69	69.42	9.27	3.15	9.27

Note: Acreage figures are approximate; they have been calculated using AutoCad Release 12.

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LIST OF ACRONYMS

ACRONYM	DEFINITION
°F	degrees Fahrenheit
AAFES	Army and Air Force Exchange Service
ACM	asbestos-containing material
ACSS	Antilles Consolidated School System
AES	Antilles Elementary School
AHS	Antilles High School
AIS	Antilles Intermediate School
Amc	Almirante clay
AMS	Antilles Middle School
AMSA	Army Maintenance Support Activity
AOC	Area Of Concern
ARCOM	U.S. Army Reserve Command
AST	aboveground storage tank
BCP	BRAC Cleanup Plan
BRAC	Base Realignment and Closure
BTEX	benzene, toluene, ethylbenzene, and xylene
CERCLA	Comprehensive Environmental Response, Compensation and Liability Act
CERCLIS	Comprehensive Environmental Response, Compensation and Liability Information System
CERFA	Community Environmental Response Facilitation Act
CFR	Code of Federal Regulations
CPC	Caribbean Petroleum Corporation
CRD	Community Recreation Division
DA	Department of the Army
DDD	dichlorodiphenyldichloro-ethane
DDE	dichlorodiphenyldichloro-ethylene
DDT	dichlorodiphenyltrichloroethane
DECA	Defense Commissary Agency
DEH USAG	Department of Engineering and Housing U.S. Army Garrison
DOD	Department of Defense
DOJ	Department of Justice

DPDO	Defense Property Disposal Office
DPW	Directorate of Public Works
DRMO	Defense Reutilization and Marketing Office
EBS	Environmental Baseline Survey
EEO	Equal Employment Opportunity Office
EPA	U.S. Environmental Protection Agency
EPCRA	Emergency Planning and Community Right-To-Know Act
EQB	Environmental Quality Board
ERNS	Emergency Response Notification System
FBI	Federal Bureau of Investigation
FINDS	Facility Index System
FORSCOM	U.S. Army Forces Command
FY	fiscal year
HQ	Headquarters
HR	hazardous substance release or disposal
HS	hazardous substance storage
IRP	Installation Restoration Program
kg	kilograms
kv	kilovolt
LBP	lead-based paint
MOGas	mobility gas
MP	military police
MSDSs	Material Safety Data Sheets
MSL	mean sea level
MTBE	methyl tertiary-butyl ether
NAAQS	National Ambient Air Quality Standards
NCO	Non-Commissioned Officer
n.d.	no date
NEPA	National Environmental Policy Act
NHPA	National Historic Preservation Act
NPDES	National Pollutant Discharge Elimination System
NPL	National Priorities List
NSPS	New Source Performance Standards
O&M	Operations and Maintenance

LIST OF ACRONYMS

OMS	Organizational Maintenance Shop
OWS	oil/water separator
PCBs	polychlorinated biphenyls
pCi/L	picocuries per liter
PL	Public Law
PM	Provost Marshal
PMDA	Programmatic Memorandum of Agreement
ppb	parts per billion
PR	petroleum release or disposal
PRASA	Puerto Rico Aqueduct and Sewer Authority
PREPA	Puerto Rico Electric Power Authority
PS	petroleum storage
PSD	Prevention of Significant Deterioration
PVC	polyvinyl chloride
PX	Post Exchange
R	radon
RCHNHSW	Regulation for the Control of Hazardous and Non-Hazardous Solid Wastes
RCRA	Resource Conservation and Recovery Act
RD	radiological hazards
RG	Readiness Group
RFI	RCRA Facility Investigation
SI	site investigation
SWMUs	solid waste management units
TBA	tertiary-butyl-alcohol
TCLP	toxic characteristic leaching procedure
TPH	total petroleum hydrocarbons
TPQ	threshold planning quantity
TSC	Training and Support Center
USACE	U.S. Army Corps of Engineers
USAR	U.S. Army Reserve
USARC	U.S. Army Reserve Center
USGS	U.S. Geological Service
USP&FO	U.S. Property and Fiscal Office
UST	underground storage tank

USTCP	Underground Storage Tank Control Program
Uv	Urban land-Vega Alta complex
UXO	unexploded ordnance
WWTP	wastewater treatment plant
XRF	X-ray fluorescence

1.0 INTRODUCTION

The Environmental Baseline Survey (EBS) report for Fort Buchanan was prepared by Woodward-Clyde Federal Services (Woodward-Clyde) for the U.S. Army Corps of Engineers (USACE) under Contract No. DACA67-95-D-1001, Delivery Order No. 0008. This section describes the purpose and scope of the work conducted in preparing the U.S. Army Base Realignment and Closure (BRAC) 95 EBS report.

The information provided in this Final EBS Report is current as of February 1996; however, comments received from installation personnel and the regulatory community on the Draft and Draft Final EBS Reports have been incorporated, as appropriate. The comments and corresponding responses have been compiled in a Comment Response Package that is included as Appendix A.

Fort Buchanan, located in Bayamón and Guaynabo Counties, Puerto Rico, is a U.S. government property selected for realignment by the BRAC 95 Commission (Figure 1-1). Fort Buchanan encompasses approximately 746 acres. The entire Fort Buchanan installation and adjacent properties were evaluated as part of the EBS. However, only the four housing areas (encompassing approximately 80 acres) have been identified as BRAC 95 property to be transferred or leased, and only these 80 acres have been placed into BRAC parcels based on their environmental condition.

The installation was established in 1923 with a primary mission to serve as a training area for the 65th Infantry Regiment. It was then used as a maneuver area for U.S. Army and National Guard Troops and also as a Citizen’s Military Training Camp from 1926 to 1939. From May 1, 1940 to August 23, 1966, Fort Buchanan was part of the Antilles Command and served as a supply depot, an induction center, and a training area. On August 23, 1966, Fort Buchanan closed with the deactivation of the Antilles Command and became the Naval Supply Annex San Juan. It was returned to the U.S. Army in December 1971. On July 1, 1973, Fort Buchanan was reassigned to the U.S. Army Forces Command (FORSCOM) and, as a result of closure studies conducted in 1976, it became a sub-installation of Fort McPherson, Georgia in October 1977 (U.S. Army Corps of Engineers 1991a; Environmental Science and Engineering, Inc. 1984). Since 1977, Fort Buchanan has provided administrative and logistical support to active duty and reserve components in Puerto Rico and the U.S. Virgin Islands. Support functions include planning and preparation for mobilization and deployment of Reserve Component Forces in Puerto Rico and the U.S. Virgin Islands; and the planning, coordination, and execution of all U.S. Army-related anti-terrorism counter actions on the island (Harland Barthelomew & Associates, Inc. 1994).

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1.1 BRAC PROGRAM OVERVIEW

Prior to the late 1980s, base closure was a time-consuming and inconsistent process. The Secretary of Defense, in cooperation with Congress, proposed a base closure law to create a process to close bases and bring base infrastructure in line with force structure. Public Law (PL) 100-526, enacted in October 1988, created the Commission on Base Realignment and Closure. The law charged the Commission with recommending installations for closure or realignment based on an independent study of the domestic military base structure.

The closure process was refined in PL 101-510, in which Congress created the Defense Base Closure and Realignment Commission. The process identified installations based on eight criteria, including four military value criteria; savings and return-on-investment; and the economic and environmental impacts of closure. The Commission met in 1991, 1993, and 1995, and its recommendations are currently being implemented by the Department of Defense (DOD).

The BRAC environmental restoration program is similar to DOD's Installation Restoration Program (IRP), but it has been expanded to include non-Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) contamination substances that are not normally addressed under the IRP, including asbestos-containing material (ACM), lead-based paint (LBP), polychlorinated biphenyls (PCBs), radon, unexploded ordnance (UXO) and/or ordnance fragments, radionuclides, and pesticides.

The Community Environmental Response Facilitation Act (CERFA) (PL 102-426) was enacted in 1992 and amends Section 120 of CERCLA. CERFA directs federal agencies to evaluate all base closure and realignment property to identify uncontaminated parcels and allows the transfer or lease of remediated parcels when the successful operation of an approved remedy has been demonstrated. The CERFA identification process considers hazardous substances and petroleum products.

1.2 PURPOSE AND SCOPE OF ENVIRONMENTAL BASELINE SURVEY

The BRAC 95 environmental restoration program for Fort Buchanan was initiated by conducting an EBS. This EBS included the review of existing installation documents; federal, commonwealth, and local government records; and aerial photographs. A site visit, which included visual inspections and employee interviews, was also conducted. Additionally, reasonably obtainable federal, commonwealth, and local government records for adjacent properties were reviewed. This EBS report describes the environmental condition of the BRAC property and may be used to support determination of the suitability for transfer or lease.

The purpose of the EBS is to classify discrete areas of the BRAC property into one of seven standard environmental condition of property types as defined by CERFA guidance and the DOD *BRAC Cleanup Plan (BCP) Guidebook* (DOD 1993). This is achieved by:

- Identifying, characterizing, and documenting the obviousness of the presence or likely presence of a release or threatened release of a hazardous substance or petroleum product associated with the historical and current use of Fort Buchanan.

- Identifying, characterizing, and documenting the obviousness of the presence or likely presence of a release or threatened release of a hazardous substance or petroleum product from an adjacent property that is likely to cause or contribute to contamination at Fort Buchanan.

No sampling or analysis activities were associated with this survey.

1.3 DEFINITIONS

The following definitions are used in this report:

- **BRAC property:** The installation real property that is subject to transfer or lease. Real property includes land and rights in land, ground improvements, utility distribution systems, pipes or pipelines, buildings, and other structures located on the property and affixed to the land.

- **Adjacent properties:** Those properties, on or off the installation, contiguous to or nearby the property boundaries being surveyed that are likely to cause or contribute to contamination and affect the results of the EBS or the classification of the BRAC property into standard environmental condition of property area types.

- **BRAC parcel:** An area of BRAC property that can be segregated from its surrounding areas based on the environmental condition of the area.

- **Hazardous substances:** Substances listed in 40 Code of Federal Regulations (CFR) 302.4, CERCLA Hazardous Substance Table.

- **Petroleum:** Any petroleum product or its derivatives, including aviation fuel and motor oil.

- **Environmental condition of property area type:** Any of the seven standard environmental condition of property area types (categories) as defined in the CERFA guidance and the DOD *BCP Guidebook* (DOD 1993) and presented in Table 1-1.

Table 1-1
ENVIRONMENTAL CONDITION OF PROPERTY DEFINITIONS

CATEGORY 1
Areas where no storage for one year or longer, release, or disposal of hazardous substances or petroleum products has occurred (including no migration of these substances from adjacent properties). Additionally, includes areas where no evidence exists for the release, disposal, or migration of hazardous substances or petroleum products; however, the area has been used to store less than reportable quantities of hazardous substances (40 CFR 302.4) or 600 or fewer gallons of petroleum products.
CATEGORY 2
Areas where only storage of hazardous substances in amounts exceeding their reportable quantity or petroleum products exceeding 600 gallons has occurred, but no release, disposal, or migration has occurred.
CATEGORY 3
Areas where storage, release, disposal, or migration of hazardous substances or petroleum products has occurred, but at concentrations that do not require a removal or remedial response.
CATEGORY 4
Areas where storage, release, disposal, or migration of hazardous substances or petroleum products has occurred, and all removal or remedial actions to protect human health and the environment have been taken.
CATEGORY 5
Areas where storage, release, disposal, or migration of hazardous substances or petroleum products has occurred, and removal or remedial actions are underway, but all required actions have not yet been implemented.
CATEGORY 6
Areas where storage, release, disposal, or migration of hazardous substances or petroleum products has occurred, but required removal or remedial actions have not yet been initiated.
CATEGORY 7
Areas that are not evaluated or require additional evaluation.

- **Suitable for transfer:** BRAC parcels that are designated as Category 1, 2, 3, or 4 are suitable for transfer or lease, subject to consideration of the non-CERCLA qualifiers.

- **Not suitable for transfer:** BRAC parcels that are currently designated as Category 5, 6, or 7 are not suitable for transfer.

- **Retained Army property:** An area of the installation real property that will be retained by DOD.

- **Parcel labels:** Each BRAC parcel has been given a number to which appropriate descriptive labels are attached. The numbers consist of a unique parcel identification number and an environmental condition of the property category number. The labels consist of a designation describing the type of contamination or storage, if applicable. The following designations are used to indicate the type of contamination or storage present in a parcel.

  PS = Petroleum storage
  PR = Petroleum release or disposal
  HS = Hazardous substance storage
  HR = Hazardous substance release or disposal

  Examples of this identification system follow:

  – 2(1) indicates that the second parcel is designated as a Category 1 parcel.

  – 12(3)HR indicates that the twelfth BRAC parcel is designated as Category 3 because of a documented hazardous substance release, but the concentrations do not warrant remediation.

- **Qualified parcels:** Areas containing or suspected of containing non-CERCLA contamination substances that may limit or preclude the transfer or lease of the property for unrestricted use. These parcels will be delineated separately and labeled with the letter “Q” for “qualified.” Qualified parcels overlay all environmental condition of the property categories (i.e., Categories 1 through 7). The qualified parcel labels are identified with the following qualifiers, as applicable:

A	=	Asbestos-containing material (ACM)
L	=	Lead-based paint (LBP)
P	=	Polychlorinated biphenyls (PCBs)
R	=	Radon
X	=	Unexploded ordnance (UXO) and/or ordnance fragments
RD	=	Radionuclides

For all parcels, "(P)" is used to indicate that the presence of a contaminant is possible, but that data are unavailable for verification.

For example, the fifth BRAC parcel with the presence of ACM and the possible presence of LBP will be labeled 5Q-A/L(P).

1.4 LIMITATIONS

Although this investigation was performed professionally, no investigation may be considered so comprehensive as to guarantee complete information regarding the possible presence of materials on the installation that currently or in the future may be considered hazardous. The conclusions presented in this EBS report are based on information that was reasonably available from the designated installation contacts and other public sources at the time the EBS was conducted. In addition, information obtained from the records review and interviews has been assumed to be correct and complete, unless contradictory information was obtained through other sources.

1.5 GENERAL GEOGRAPHIC AND ENVIRONMENTAL SETTINGS

Fort Buchanan has been divided into 18 geographic areas that together encompass approximately 746 acres (Figure 1-2). Seventeen of the geographic areas are contiguous. The Army Maintenance Support Activity (AMSA) Center, comprised of approximately seven acres, is located north of the main installation. A complete listing of all 18 geographic areas of the installation and their approximate size is provided in Table 1-2.

Table 1-2
GEOGRAPHIC AREAS

GEOGRAPHIC AREA	APPROXIMATE SIZE (ACRES)
AMSA Center	7
Southwest Undeveloped Area	55
South Undeveloped Area	46
Southeast Undeveloped Area	9
North Undeveloped Area	8
Golf Course Area	90
School Area	52
Intermediate School Area	21
500 Area	106
600 Area	121
300 Area	43
200 Area	29
1300 Area	21
Recreational Area	40
Coconut Grove Family Housing Area	33
Buchanan Heights Family Housing Area	15
Las Colinas Family Housing Area	34
Coqui Gardens Family Housing Area	16
TOTAL	**746**

1.5.1 Demographics

San Juan is the most populous city in the Commonwealth of Puerto Rico with a population of 449,285 in 1990. The San Juan Metropolitan Statistical Area reported a 1990 census of 1.7 million people. The cities of Bayamón and Cataño are also in the metropolitan area and are also among the commonwealth's largest. Active-duty military personnel and their dependents at the installation totaled 1,418 persons as of December 18, 1991. Of the total military-related population, almost 430 were reported to live off post. Other population segments at the installation include the Reserve Component Training population, which includes the training missions of the U.S. Army Reserves and the Puerto Rico Army National Guard. The total population of these units is 15,000, but the full-time equivalent population is 1,900 persons. This means that at any given time there would be no more than 1,900 Army reservists or National Guardmembers at the installation. In total, Fort Buchanan supports over 39,000 persons that are eligible for post privileges. Nearly 36,000 of these are either retirees, family members, or Department of the Army (DA) civilians (Harland Barthelomew & Associates, Inc. 1994). A general site location map has been included as Figure 1-1.

1.5.2 Physical Setting

Fort Buchanan is located within the San Juan, Puerto Rico metropolitan area (approximately six miles southwest of San Juan) and occupies approximately 746 acres within two municipalities: Bayamón and Guaynabo. Fort Buchanan is surrounded by industrial, commercial, residential, and open-space properties. Physiographically, Fort Buchanan is located on the northern coastal plain, which is about five miles wide and slopes gently upward to the central mountain chain. Scattered throughout the area are limestone hills that resemble haystacks rising above the coastal plain. Many of the "haystack hills" or "mogotes" are located on the perimeter of the installation. These hills are rich in limestone and have been excavated for use as raw material for cement products. Due to the limited developable areas and severe slopes of the haystack hills, topography has been a limiting factor for property development at Fort Buchanan (U.S. Army Corps of Engineers 1991a; Hill 1980; Environmental Science and Engineering, Inc. 1984).

Elevations across Fort Buchanan range from 20 feet to 250 above mean sea level (MSL). The majority of the installation is flat to gently rolling, with the steeper areas located mainly on the northern and southern portions of the base (Environmental Science and Engineering, Inc. 1984).

1.5.3 Climatology

The climate is a tropical marine climate that is somewhat modified by the effect of mountain ranges that lie approximately 20 miles south of the San Juan metropolitan area. Air circulation from the higher altitudes results in land breezes that bring lower night temperatures, especially during the winter. Temperatures are moderate and constant, with very few hot days or chilly nights. For the most part, a maximum range from 74 degrees to 86 degrees Fahrenheit (°F) can be anticipated, with an average annual temperature of approximately 80°F. Rainfall ranges from 60 to 75 inches annually, and the wind patterns vary considerably, generally prevailing from the northeast during the day and from the southeast at night.

1.5.4 Hydrology

The Rio de Bayamón is the principal river draining the area that includes Fort Buchanan. There are three creeks crossing the installation that carry stormwater flows. The largest of these, El Toro Creek, runs from south to north and carries most of the stormwater from land adjacent to the post and from the installation itself. This creek joins the Malaria Control Canal, which discharges into the Caño de Aguas Frias. El Toro Creek receives all runoff from the maintenance shop areas, the vehicle wash racks, and exchange service station. Interceptor ditches have been placed in the lower land areas, especially around the warehouses, to carry stormwater to a drainage canal that discharges into the Bay of San Juan (U.S. Army Corps of Engineers 1991a; Harland Barthelomew & Associates, Inc. 1994).

An artificial lake that is owned by the Puerto Rico Cement Company is located inside the boundaries of the installation. The lake is centrally located within the post and receives minor discharges from the natural and manmade stormwater systems serving the installation. This lake is in direct contact with groundwater. There is an easement for a pressure line running through the installation for the discharge of water from the lake into the Puerto Rico cement plant. As of 1991, this line was no longer in use (Harland Barthelomew & Associates, Inc. 1994; U.S. Army Corps of Engineers 1991a).

1.5.5 Geology and Soils

The coastal plain consists of deposits of sand, silt, and clay overlying older formations. The northern foothills are generally rounded hills composed mainly of sandstone, siltstone, volcanic rock, and some limestone. Alluvial deposits have built up in the valley of the Rio De Bayamón, which is where most of the development has occurred on the installation. The area contains rocks from late Cretaceous, Paleocene, and recent ages, which are representative of nearly the full range of geologic ages known to Puerto Rico. The Cretaceous and Paleocene rocks are highly deformed and faulted. They comprise a sequence of volcanic flows, pyroclastics, and sedimentary rocks, but many of the latter consist largely of reworked volcanic material (U.S. Army Corps of Engineers 1991a; Harland Barthelomew & Associates, Inc. 1994).

Overlying the upper Cretaceous and lower tertiary complex in the San Juan area is a sequence of sand, clays, marls, and limestones of early Miocene age, which has been tilted to the north and faulted on a small scale. These rocks probably underlie most of the coastal plain alluvium. As mentioned above, the hills located on Fort Buchanan are rich in limestone. Small outcrops of limestone are found on both the northern and southern hills (U.S. Army Corps of Engineers 1991a; Harland Barthelomew & Associates, Inc. 1994).

The soils in the area are part of the Martin Pena-Saladar-Hydraquents soil association. The soils located on Fort Buchanan are classified as Urban land-Vega Alta complex (Uv) and Almirante clay (Amc), 5 to 12 percent slope. Due to development, the Uv soils in this area could not be identified. However, undisturbed Vega Alta soils have a friable dark yellowish-brown clay loam layer. These soils are generally well-drained and located on coastal plains and stream terraces. The Almirante soils are well-drained and located on coastal plains and valleys between limestone hills. They are yellowish-brown clay with moderate permeability and medium runoff. The soil is susceptible to erosion (Harland Barthelomew & Associates, Inc. 1994).

1.5.6 Hydrogeology

There are two areas on Fort Buchanan where aquifer recharge can occur. The first recharge area is the private lake located in the central part of the installation (Puerto Rico Cement Company). This lake is continuous with the aquifer. The second and most predominant location is in the haystack hills. The haystacks are remnants of karstic forms. Solution developments around the periphery of the haystacks cause sink holes to appear. The result is a productive lens of water beneath Fort Buchanan. This lens is part of the Ayamamón-Aguada Aquifer System. The aquifer is susceptible to pollution since it is continuous with surface waters (Harland Barthelomew & Associates, Inc. 1994; Environmental Science and Engineering, Inc. 1984).

Reservoirs at La Plata that serve the San Juan area are being depleted and new sources are being sought. To that end, one well was drilled in the northwest corner of Fort Buchanan to determine if the aquifers beneath the installation are productive. Preliminary tests conducted by the U.S. Geological Survey (USGS) indicated that the wells are productive and could be used to supply water to the San Juan area. About 15 other wells are located at Fort Buchanan and were used during the 1940s to supply water to the base, but have since been capped (Harland Barthelomew & Associates, Inc. 1994).

According to a report prepared by the USGS, there are two aquifers in the vicinity of Fort Buchanan, and groundwater flows from the southwest to the northeast into San Juan Bay (Anderson 1976). According to the last available *Annual Groundwater Monitoring Report* (1993) from an adjacent property located to the northwest of the installation, the groundwater flow rate in the uppermost aquifer is estimated to range from 3.3 to 7.8 feet per year.

2.0 SOURCES OF INFORMATION

The EBS investigation meets the requirements of CERCLA (1980) Section 120(h), as amended by CERFA and implemented by DOD. This section describes the sources of information that were used to support the determination of the environmental condition of the Fort Buchanan BRAC property.

2.1 INSTALLATION / BRAC PROPERTY

Relevant documents that were used to conduct the Fort Buchanan EBS are identified in the following sections. This information includes environmental studies; federal, commonwealth, and local regulatory records; interviews of installation personnel; and visual inspections within a half-mile distance of the installation.

2.1.1 Existing Documents

Existing documents at Fort Buchanan were reviewed to evaluate the environmental conditions at Fort Buchanan. Memorandums were written to document interviews and site visits. The 66 documents presented in Table 2-1 are the primary documents used in the preparation of the EBS report. Each document has a document identification number, which is referenced in the CERFA map tables (Tables 5-1a and 5-1b) in Section Five. These documents are the primary source of evidence for the resulting environmental condition of property area categorization. A complete list of references is included in Section Six.

Table 2-1
PRIMARY DOCUMENTS

DOCUMENT TITLE	AUTHOR	DATE	EBS SOURCE OF EVIDENCE DOCUMENT IDENTIFICATION NUMBER
Emergency Planning and Community Right-to-Know Act Compliance Inventory, Ft. Buchanan, Puerto Rico	CH2M Hill	September 30, 1994	1

Table 2-1
(Continued)

DOCUMENT TITLE	AUTHOR	DATE	EBS SOURCE OF EVIDENCE DOCUMENT IDENTIFICATION NUMBER
Groundwater in the San Juan Metropolitan Area, Puerto Rico	Henry R. Anderson	July 1, 1976	2
Installation Operations, Environmental Impact Statement, Ft. Buchanan, Puerto Rico	Edward C. Hill	September 10, 1980	3
Memorandum Regarding U.S. Army Reserve Parking Area Across from Building 538, Ft. Buchanan, Puerto Rico	Thomas L. Oetjen	May 25, 1995	4
Memorandum Regarding Training and Support Center (TSC) RCRA Inspection, Ft. Buchanan, Puerto Rico	Felix Mariani	December 5, 1994	5
Memorandum Regarding Directorate of Public Works (DPW) Activity Shops Inspections, Ft. Buchanan, Puerto Rico	Felix Mariani	November 18, 1994	6
Certification (AMSA 161 Tank Testing)	Rafael Timothee	Unknown	7
Letter Regarding NATCO Tankless Water Heater and (8) Emergency Generators, Ft. Buchanan, Puerto Rico	Francisco Claudio Rios	May 30, 1995	8
Informe de Progreso Actividades Realizadas por La Junta, Ft. Buchanan, Puerto Rico	Puerto Rico Environmental Quality Board	November 21, 1995	9
Drinking Water Sampling Program	Environmental Quality Laboratories	Unknown	10
Memorandum Regarding Post Sanitary Landfill, Ft. Buchanan, Puerto Rico	Jose A. Padilla	December 11, 1979	11
Real Property Master Plan, Long Range Development Plan, Ft. Buchanan, Puerto Rico	Harland Barthelomew & Associates, Inc.	September 1, 1994	12

Table 2-1
(Continued)

DOCUMENT TITLE	AUTHOR	DATE	EBS SOURCE OF EVIDENCE DOCUMENT IDENTIFICATION NUMBER
Memorandum Regarding Programmatic Memorandum of Agreement (PMDA) for Demolition of World War II Temporary Buildings, Ft. Buchanan, Puerto Rico	Gerald C. Brown	January 24, 1994	13
Structure T265 Evaluation, Ft. Buchanan, Puerto Rico	Keith Landreth	March 21, 1990	14
National Wetlands Inventory Map	U.S. Fish and Wildlife Service	February 1, 1983	15
Environmental Assessment, Haystack Hill Earth and Slope Stabilization, Matosantos Commercial Corporation, Ft. Buchanan, Guaynabo, Puerto Rico	U.S. Army Corps of Engineers and Matosantos	November 1, 1995	16
Gas Station Pump Calibration Records, Ft. Buchanan, Puerto Rico	Army and Air Force Exchange Service	October 21, 1995	17
Memorandum Regarding Results of Percolation Test at Existing 5,000 and 10,000 Gallon Tank at PX Gas Stations, Ft. Buchanan, Puerto Rico.	Jaca & Sierra Testing Laboratories	February 8, 1991	18
Hazardous and Toxic Waste Assessment, Ft. Buchanan, Puerto Rico	U.S. Army Corps of Engineers	September 30, 1994	19
Environmental Assessment Base Operations, Ft. Buchanan, Puerto Rico	U.S. Army Corps of Engineers	March 1, 1991	20
Hazardous Waste Consultation No. 37-26-0229-89 Closure and Sampling Plans for Hazardous Waste Storage, Ft. Buchanan, Puerto Rico	U.S. Army Environmental Hygiene Agency	July 5, 1988	21
Letter Regarding Determination on Soil Sampling Programs at Solid Waste Management Unit 3, Ft. Buchanan, Puerto Rico	Andrew Belling	July 14, 1995	22

Table 2-1
(Continued)

DOCUMENT TITLE	AUTHOR	DATE	EBS SOURCE OF EVIDENCE DOCUMENT IDENTIFICATION NUMBER
Installation Assessment of Ft. Buchanan, Puerto Rico	Environmental Science and Engineering, Inc.	February 1, 1984	23
Letter Regarding Status of Army Radon Reduction Program, Ft. Buchanan, Puerto Rico	Juan G. Robles	December 8, 1992	24
Final Asbestos Survey for Buildings 1195 - 1241, Ft. Buchanan, Puerto Rico	Pickering Environmental Consultants, Inc.	July 8, 1991	25
Lead-Based Paint Survey Results, Vol. III, Ft. Buchanan, Puerto Rico	U.S. Army Corps of Engineers	December 7, 1993	26
Lead-Based Paint Survey, Vol. II, Ft. Buchanan, Puerto Rico	U.S. Army Environmental Hygiene Agency	August 5, 1992	27
PCBs Analytical Results, Ft. Buchanan, Puerto Rico	Angel A. Perez	January 1, 1981	28
RCRA Facility Assessment Report, Ft. Buchanan, Puerto Rico	Edwin A. Cabrera	October 10, 1991	29
Storm Water Pollution Prevention Plan, U.S. Army, Ft. Buchanan, Puerto Rico	CH2M Hill	May 1, 1994	30
Environmental Quality Board Air Quality Area Validation and Data Services	Environmental Quality Board	January 1, 1991	31
Telephone Conversation with Tony Perez, Ft. Buchanan, Puerto Rico	Greg Waldmann	January 10, 1995	32
Memorandum Regarding Lead-Based Paint Removal from all Housing, Ft. Buchanan, Puerto Rico	Greg Waldmann	January 12, 1996	33
Visual Inspection of 500 Area, Ft. Buchanan, Puerto Rico	Greg Waldmann	December 18, 1995	34
Interview with Edward Hill, Ft. Buchanan, Puerto Rico	Susan Gawarecki	December 6, 1995	35
Interview with Nelson Cruz, Ft. Buchanan, Puerto Rico	Susan Gawarecki	December 4, 1995	36

Table 2-1
(Continued)

DOCUMENT TITLE	AUTHOR	DATE	EBS SOURCE OF EVIDENCE DOCUMENT IDENTIFICATION NUMBER
Results of Underground Storage Tank (UST) Closure Operations, Ft. Buchanan, Puerto Rico	Environmental Service and Technology Corporation	October 1, 1994	37
Letter Regarding Final Closure Report, Department of Navy, Group (AMSA) 161-G, Building 653, Ft. Buchanan, Puerto Rico	Junta de Calidada Ambiental	December 9, 1994	38
Analytical Report, Ft. Buchanan Oil Spots	Analytical Environmental Services, Inc.	September 25, 1995	39
Underground Storage Tank Removal at Building 152, Ft. Buchanan, Puerto Rico	U.S. Army	June 1, 1995	40
Memorandum Regarding Underground Storage Tanks at the National Guard Warehouse Construction Site on Ft. Buchanan, Puerto Rico	James E. McCarthy, Jr.	March 12, 1992	41
Soil Pile Sampling Reports, Puerto Rico National Guard, Ft. Buchanan, Guaynabo, Puerto Rico	Law Environmental	November 1, 1992	42
Scope of Work, Completion of a Site Investigation at the Building 152 UST Site, Ft. Buchanan, San Juan, Puerto Rico	U.S. Army Corps of Engineers	August 18, 1995	43
Closure Certification Approval, Hazardous Waste Storage Area Buildings 596 and 539, Ft. Buchanan, Puerto Rico	Florez del Valle	December 24, 1992	44
Final Report for the RCRA Closure of a Pesticide Shop Phase III, Ft. Buchanan, Puerto Rico	U.S. Army Corps of Engineers	April 15, 1992	45
Letter Regarding Abandonment of UST at Building 138 (UIC Permit 86-0053), Ft. Buchanan, Puerto Rico	Glen J. Lozier	November 2, 1990	46
Visual Inspection of DPW Compound, Ft. Buchanan, Puerto Rico	Susan Gawarecki	December 8, 1995	47

Table 2-1
(Continued)

DOCUMENT TITLE	AUTHOR	DATE	EBS SOURCE OF EVIDENCE DOCUMENT IDENTIFICATION NUMBER
Visual Inspection of Recreational Area, Ft. Buchanan, Puerto Rico	Janet Sheldon	December 8, 1995	48
Visual Inspection of Schools, Ft. Buchanan, Puerto Rico	Greg Waldmann	December 15, 1995	49
Visual Inspection of 300 Area, Ft. Buchanan, Puerto Rico	Greg Waldmann	December 15, 1995	50
Visual Inspection of Recreation Southwest, Ft. Buchanan, Puerto Rico	Greg Waldmann	December 11, 1995	51
Telephone Conversation with Greg Waldmann.	Felix Mariani	February 2, 1996	52
Faxed Materials Sent to Greg Waldmann	Felix Mariani	February 2, 1996	53
Building Information Schedule, Fort Buchanan, Puerto Rico	Fort Buchanan Real Estate Office	1995	54
Faxed Materials Sent to Greg Waldmann	Angel A. Perez	January 22, 1996	55
Asbestos Materials - Family Housing	Fort Buchanan	October 24, 1995	56
ACM Abatement Status, Fort Buchanan, Puerto Rico	Environmental Resource Associates	December 11, 1995	57
Visual Inspection of Southwest Undeveloped Area, Fort Buchanan, Puerto Rico	Greg Waldmann	December 11, 1995	58
Project Information for Underground Storage Tanks, Buildings 20, 152 and 615, Fort Buchanan, Puerto Rico	Environmental Resource Associates	March 6, 1995	59
Pollution Prevention Plan and Pollution Prevention Opportunity Assessment, Fort Buchanan, Puerto Rico	CH2M Hill	September 1995	60
Air Pollution Emission Statement Number 43-21-N3EJ-94, Fort Buchanan, Puerto Rico	U.S. Army Environmental Hygiene Agency	January 20, 1995	61

Table 2-1
(Continued)

DOCUMENT TITLE	AUTHOR	DATE	EBS SOURCE OF EVIDENCE DOCUMENT IDENTIFICATION NUMBER
1993 Annual Groundwater Monitoring Report, Equalization Basin, RCRA Interim Status, Caribbean Petroleum Corporation, Bayamón, Puerto Rico	Anderson-Mulholland and Associates, Inc.	March 1, 1994	62
RCRA Post-Closure Permit Application, Caribbean Petroleum Corporation, Bayamón, Puerto Rico	Anderson-Mulholland and Associates, Inc.	December 1994	63
Letter Regarding the Discharge of Domestic Wastewaters to Water Bodies Flowing Through Fort Buchanan	Héctor Russe Martinez, Chairman, Environmental Quality Board	January 16, 1996	64
Toro Creek Surface/Stream Water Grab Sample Results, Fort Buchanan, Order #96-05-072	Environmental Quality Laboratories, Inc.	May 22, 1996	65
Letter to Mr. Bruce Kiselica, P.E., Director, Water Management Division, EPA, Region 2 Regarding PRASA's Corrective Actions for Sewage Discharge to El Toro Creek, Fort Buchanan	Clara O'Neill, Acting Director for Environmental Services Area	May 30, 1996	66

2.1.2 Federal, Commonwealth, and Local Government Regulatory Records

A search of federal records pertaining to Fort Buchanan and a search of reasonably obtainable federal, commonwealth, and local records of adjacent (half-mile radius) property was performed. A search of federal computerized databases was limited to listing all the sites within the zip code for Fort Buchanan and the three zip codes of the areas that surround the base. A map of adjacent properties was obtained by conducting site reconnaissance to identify the location of properties listed from the database search. No computerized searches were available from commonwealth records in the area of Fort Buchanan. A search of the local Environmental Quality Board (EQB) records, which contained a comprehensive database for all of Puerto Rico, was conducted. Table 2-2 lists the environmental databases searched.

Table 2-2

ENVIRONMENTAL DATABASES

DATABASE	CONTENTS
National Priorities List (NPL)	The NPL lists Superfund sites, which are sites that are determined by the U.S. Environmental Protection Agency (EPA) to pose an immediate public health hazard requiring immediate cleanup response.
Comprehensive Environmental Response, Compensation and Liability Information System (CERCLIS)	The EPA CERCLIS database tracks CERCLA sites.
Emergency Response Notification System (ERNS)	EPA maintains ERNS, which is a repository for information on hazardous spills nationwide. This information is based on reports filed by local agencies (e.g., municipal fire, police, or environmental departments), county agencies, and federal agencies (e.g., U.S. Coast Guard, National Response Center, and EPA).
Resource Conservation and Recovery Act (RCRA) Facilities Database	Facilities listed in this EPA database are RCRA facilities for which a Corrective Action has been issued to address waste handling problems.
Facility Index System (FINDS)	EPA references any facility or event that has been issued an EPA identification number; the EPA program office that issued the identification number is also listed. These listings do not necessarily reflect releases.
Database of Open Dump Sites	This database searches EPA records for information about open dump sites.
EQB - Database of Generators of Hazardous Waste	This database contains all generators of hazardous waste on the island of Puerto Rico. The facility types include: large quantity generators; small quantity generators; and conditionally exempt facilities. Large quantity generators generate over 1,000 kilograms (kg) hazardous waste/month, or greater than 1 kg acutely hazardous waste as defined by RCRA. Small quantity generators generate more than 100 and less than 1,000 kg of hazardous waste during any calendar month.
EQB Database - Ongoing Corrective Actions	This database contains all ongoing corrective actions at EQB for the island of Puerto Rico.

The federal database search report is provided in Appendix B. The federal database search has identified the following hazardous waste generators at Fort Buchanan.

- Puerto Rico Army National Guard, U.S. Property and Fiscal Office (USP&FO) Warehouse (Building 541) is a small quantity generator of non-acutely hazardous waste.

- Antilles Consolidated School System (ACSS) High School (Building 1062) is a conditionally exempt small quantity generator of non-acutely hazardous waste.

- ACSS (Building 566) is a conditionally exempt small quantity generator of non-acutely hazardous waste.

- Puerto Rico Army National Guard (Degetau Final Street) is a conditionally exempt small quantity generator of non-acutely hazardous waste.

- U.S. Army Garrison Fort Buchanan (USAG) is a conditionally exempt small quantity generator of non-acutely hazardous waste engaged in the treatment, storage, and/or disposal of hazardous waste.

- U.S. Army Reserve Center (USARC) - consolidated Organizational Maintenance Shop (OMS) (Isabella Street and Columbus Road) is a conditionally exempt small quantity generator of non-acutely hazardous waste and transports hazardous waste by highway.

- AMSA (Building 653) is a conditionally exempt small quantity generator of non-acutely hazardous waste and transports hazardous waste by highway.

- DOD Stateside Dependent School (Building 1047) is a conditionally exempt small quantity generator of non-acutely hazardous waste.

Discussions with the EPA, Region 2 office were conducted in January 1996 regarding the need to conduct a records search for additional reports pertaining to Fort Buchanan. EPA had recently moved offices, files were being temporarily stored in boxes, and there was no current file index. The EPA, Region 2 office indicated that they would not have additional documents pertaining to Fort Buchanan; therefore, this additional records search was not conducted.

2.1.2.1 Permits and Permit Applications

The following permits and permit information are maintained by Fort Buchanan.

- Reports indicate that a Group Permit Application 382 was filed for a National Pollutant Discharge Elimination System (NPDES) stormwater permit for 65 FORSCOM facilities, as well as for other U.S. Army installations under other major commands, particularly the U.S. Army Training and Doctrine Command. At the time of the EBS site visit, no stormwater or NPDES permits had been filed for activities at Fort Buchanan (CH2M Hill 1994c).

- According to Fort Buchanan personnel, the base did inquire about a RCRA Part B Permit; however, they currently operate as a small quantity generator (PR1210099999) under a RCRA Part A Permit.

- EQB maintains a permit to perform air quality work at an Air Monitoring Station located west of the Coconut Grove Housing Area at Fort Buchanan.

- Fort Buchanan has a small quantity emission source permit (PFE-LC-32-0394-0333-II-0) for one boiler that is no longer in use (Building 390) and eight emergency generators. One emergency generator (Building 20) is also no longer in use. The operable emergency generators are located in Buildings 376, 660, 399, 163, 212, 1321, and 618.

- Underground and aboveground storage tanks (USTs and ASTs) located at Fort Buchanan are not assigned unique identification numbers. Storage tanks with a volume greater than 660 gallons are registered with EQB under one number that is assigned to the base. The tanks cannot be distinguished by tank number but can be separated by building number. The information provided in Table 2-3 was obtained from UST registration forms maintained by Fort Buchanan.

Table 2-3
REGISTERED USTs AND ASTs AT FORT BUCHANAN

			IN USE OR

PERMIT NUMBER	FACILITY	LOCATION	REMOVED
UST-02-86-004 (April 7, 1995)	UST (5,000-gallon diesel tank) UST (5,000-gallon gasoline tank)	Building 615	Tanks removed and awaiting closure
UST-02-86-0044 (September 9, 1994)	UST (5,000-gallon gasoline tank) UST (10,000-gallon gasoline tank) UST (10,000-gallon gasoline tank)	Building 556 Building 381	Tanks 1, 2, and 3 in use
UST-02-86-0044 (September 9, 1994)	UST (10,000-gallon unused tank)	Building 152	Tanks removed and awaiting closure
	UST (5,000-gallon tank); tank contents are unknown UST (10,000-gallon tank); tank contents are unknown	Building 152	Tanks scheduled to be removed in 1996
UST-92-32-0031	UST (25,000-gallon tank) UST (25,000-gallon tank) UST (25,000-gallon tank) The contents of all 3 tanks are unknown	Building 541	Tanks removed in 1992; closure pending
	UST (500-gallon diesel tank)	Building 660	In use
	UST (200-gallon diesel tank)	Building 399	In use
	UST (200-gallon diesel tank)	Building 163	In use
	AST (350-gallon diesel tank)	Building 540	In use
UST-86-1982	UST (5,000-gallon diesel tank) UST (5,000-gallon diesel tank) AST (600-gallon mobility gas [MOGas] tank)	Building 654	In use
	UST (300-gallon diesel tank)	Building 20	Tank removed and awaiting closure
	AST (500-gallon gasoline/500-gallon diesel)	Building 566	Inactive
	AST (300-gallon diesel tank)	Building 168	In use
	UST (1,000-gallon diesel tank)	Building 746	Tank is scheduled to be removed; closure plan in progress

Table 2-3
(Continued)

PERMIT NUMBER	FACILITY	LOCATION	IN USE OR REMOVED
	AST (500-gallon MOGas/300-gallon gasoline/300-gallon diesel)	Building 138	Tank removed in 1973
	UST (two 5,500 to 6,000-gallon fuel oil tanks)	Building 138	Tanks are scheduled to be removed; closure plan in progress
UIC -02-86-0053	UST No. 1 (10,000-gallon heating oil tank)	Building 138	Tank removed in 1972
	AST (25-gallon diesel tank)	Building 212	In use
	AST (400-gallon diesel tank)	Building 390	Inactive
	UST No. 1 (275-gallon diesel tank)	Building 376	Tank scheduled to be removed in 1996
	UST (200-gallon diesel tank)	Building 376	In use
	UST (5,000-gallon gasoline)	Building T-552	In use
	UST (two 10,000-gallon gasoline)	Building 380	In use

2.1.2.2 Inspection Reports and Enforcement Actions

The following inspection reports were found on file at Fort Buchanan.

Percolation tests were conducted in February 1991 in the vicinity of the existing 5,000-gallon UST located at the DPW complex (Building 556) and in the vicinity of the existing 10,000-gallon UST located at the Post Exchange (PX) gas station (Building 380). No groundwater was encountered at the depth at which the tests were made (Jaca & Sierra Testing Laboratories 1991).

An internal RCRA inspection was performed on the Training and Support Center (TSC) (Building 607) by Fort Buchanan personnel during December 1994 (Mariani 1994b). The following noncompliances were noted:

- An undetermined amount of waste photographic developing chemicals was stored outside of the building in deteriorated wooden boxes. The stored material was also in poor condition due to its exposure to the weather. The boxes subsequently have been removed.

- There was not an established hazardous waste generation point. Wastes were stored and accumulated within the working areas.

- A hazardous waste generation log had not been developed to reflect the types and quantities of wastes generated and the date accumulation began.

- There was a lack of necessary materials such as Department of Transportation approved containers, labels, placards, safety storage cabinets, and spill control equipment.

- Material Safety Data Sheets (MSDSs) and hazardous waste manifest records were not available for review.

Recommendations to correct these noncompliances were provided, and a subsequent internal inspection was conducted in 1995 that identified that all noncompliances were corrected.

An internal RCRA and safety inspection of the DPW complex (Building 556) was conducted in 1994. The majority of the findings involved improper storage of hazardous materials (Mariani 1994a). Recommendations were provided to correct these noncompliances, and a subsequent internal inspection identified the need for a connex to be supplied for the used oil storage area. This connex has been received by Fort Buchanan; however, it is not currently located or in use at this facility.

The two 5,000-gallon diesel USTs located at the AMSA facility received tank tightness certification in 1995 (Timothee n.d.). Soil borings were also taken from this location and analyzed for benzene, toluene, ethylbenzene, and xylene (BTEX) and total petroleum hydrocarbons (TPH). Results from these analyses did not indicate a past release of these petroleum derivatives (Claudio Rios 1995).

The PX gas station fueling pumps receive periodic calibration inspections which indicate that minimal petroleum product is released during fueling operations. The fueling pumps have had the automatic fill lever removed, thereby requiring individuals to continually grasp the fueling nozzle. This was done to minimize the potential for overfilling. No documentation of petroleum spills above reportable quantities for the PX gas station were identified.

Two locations at water supply taps are sampled quarterly for drinking water quality by Environmental Quality Laboratories on Fort Buchanan. Analyses were performed using EPA 500 Series methods for Safe Drinking Water. Additionally, SW-846 Method 1613 for dioxins and other miscellaneous analyses for water quality following Standard Methods for Examination of Water and Wastewater (1992) were performed. These sampling locations are at the main gate and within the Coconut Grove Family Housing Area. The drinking water is supplied by Puerto Rico Aqueduct and Sewer Authority (PRASA), and no known elevated levels of contaminants have been observed following review of the 1995 fourth quarter and 1996 first quarter results (Environmental Quality Laboratories n.d.). No documents identifying elevated levels of contaminants in drinking water were obtained.

An *Emergency Planning and Community Right-To-Know Act* (EPCRA) *Compliance Inventory* was conducted in September of 1994. The following conclusions were described in this report (CH2M Hill 1994a):

- Sulfuric acid stored at the PX gas station (1,226 pounds) exceeded the threshold planning quantity (TPQ) of 500 pounds. An additional 130 pounds of this material was also observed at other locations at Fort Buchanan. This material has been removed and is currently below TPQ levels.

- The total quantity of ethylene glycol stored at Fort Buchanan (8,144.9 pounds) did not exceed the TPQ of 10,000 pounds; however, inventory control of this material is recommended to avoid exceeding the TPQ levels in the future.

- The total quantity of mineral spirits stored at Fort Buchanan (8,229 pounds), primarily as paint thinner, did not exceed the TPQ of 10,000 pounds; however, inventory control of this material is recommended to avoid exceeding the TPQ levels in the future.

Based on the quantities of sulfuric acid, gasoline, ethylene glycol, and mineral spirits currently stored at Fort Buchanan, the possibility does not exist that more than 10,000 pounds of these chemicals are used on an annual basis. This is the limit whereby EPCRA Section 313 reporting would be required.

Discussions with installation personnel indicated that Fort Buchanan has reduced its storage of these chemicals and they are operating under a tier 1 and tier 2 registration.

An Environmental Compliance Assessment was performed on Fort Buchanan in 1993. All noncompliance issues identified had been resolved at the time of the EBS site visits.

A pollution prevention plan and pollution prevention opportunity assessment was prepared for Fort Buchanan in 1995. Modifications to pollution prevention practices are currently being made.

An inspection was performed at Fort Buchanan by the EQB, Land Pollution Control Area Division on September 21, 1995. At the time of the inspection, the company was found in compliance with the Regulation for the Control of Hazardous and Non-Hazardous Solid Wastes (RCHNHSW) and 40 CFR 262 and 265. As of December 1992, radon gas testing had occurred at Fort Buchanan within 323 Priority 1 structures (day care centers, hospitals, schools and living areas, and family housing); 3 Priority 2 structures (areas having 24-hour per day operations, such as training areas and message centers), and 229 Priority 3 structures (all other routinely occupied structures such as reserve centers, offices, theaters, and stores). Results were not above the EPA action level of 4 picocuries per liter (pCi/L) (Robles 1992).

No Notice of Violation or other enforcement actions were identified for Fort Buchanan.

2.1.3 Aerial Photographs

Aerial photographs of Fort Buchanan, obtained from the Department of Transportation, and the surrounding area were reviewed from the following years: 1937, 1962, 1967, 1971, 1981, 1990, and 1995. In 1937, Fort Buchanan consisted of mainly undeveloped land; by 1962, Fort Buchanan looked as it does today. A few structures have been added or removed since 1962, but overall Fort Buchanan has remained the same. The development of several industrial parks surrounding Fort Buchanan became prevalent in 1981. Any anomalies noted in the aerial photographs were inspected during site investigations.

2.1.4 Existing Property Maps

Existing property maps were utilized in identifying past use and practices at Fort Buchanan that may have contributed to environmental degradation or concerns. Property maps were also used to determine current physical conditions of the installation and to focus on areas where there may have been concerns regarding past or current waste management practices. An installation map was provided in an electronic format. This map was digitized using AutoCad Release 12 and was used as the base for the CERFA map presented in Section Five (Figure 5-1).

2.1.5 Interviews

To facilitate the review of the installation's environmental history and practices, interviews of current and former employees involved in operations were conducted. The purpose of the interviews was to support the determination of the environmental condition of the property. To ensure the interview process was thorough, standardized interview forms were created and utilized. A sample interview form is presented in Appendix C.

Tables 2-4 and 2-5 provide a listing of the individuals who were interviewed.

Table 2-4
INTERVIEWS OF INSTALLATION PERSONNEL
CONDUCTED DECEMBER 1995

NAME	TITLE	ORGANIZATION	TELEPHONE NUMBER	PERIOD ASSOCIATED WITH AREA OR FACILITY
Carrie Grobs Reed	Environmental Protection Specialist	Defense Reutilization and Marketing Service (DRMS)	(614) 692-2275	12 years
Eunice Ford	Geographic Project Manager	USACE, Jacksonville, Florida	(904) 232-2415	8 years
Daisey Mather	Base Closure Group	EPA, Region 2	(212) 637-3493	1 year
Bob Wing	Federal Facilities/Superfund Division	EPA, Region 2	(212) 637-4332	1 year
Clifford Ng	RCRA Division	EPA, Region 2	(212) 637-4173	1 year
Lt. Col. Joseph Roura, P.E.	Supervisory Facility Management Specialist	65th ARCOM	(809) 277-2195/2196	25 years

Fred Alberty	Automotive Supervisor	Community Recreation Division	(809) 273-3972	3½ years
Edwardo Hill	Environmental Scientist (NEPA Specialist)	FORSCOM	(404) 669-6361	8 years
Ferdinad Feliciano	Environmental Safety Engineer	ACSS	(809) 793-6995	1 year
José A. Colón	Industrial Hygiene Technician	U.S. Army Health Clinic, MEDCOM	(809) 273-2175	3 years
Victor Cosme	Supply Officer	Department of Logistics (DOL)	(809) 273-3970	11 years
Jesus Galvez Ortiz	Environmental Manager	65th Army Reserve Command	(809) 273-0708	3 years
José Rodríguez	Hydrologist	USGS, Water Resources	(809) 749-4346	9 years
José Pagán	Public Affairs Office	Headquarters	(809) 273-3881	7 years
Ferdinand Torres	Supervisory General Engineer Chief, Operations and Maintenance, DPW	Operations and Maintenance	(809) 273-3484	12 years
Nilsa Hernandez de Ferrer	Employee, Retired Development Specialist	Personnel	(809) 273-3773	20 years
Tom Kulina	Director	Director of Planning and Community Affairs (DPCA)	(809) 273-3530	4 years
Raul Gierbolini	Environmental Specialist	DRMO Roosevelt Roads	(809) 865-5518	2 years
Iris Fuentes	Housing Manager	DPW	(809) 273-3256	15 years

Table 2-4
(Continued)

NAME	TITLE	ORGANIZATION	TELEPHONE NUMBER	PERIOD ASSOCIATED WITH AREA OR FACILITY
Nelson Cruz	Lead Greenskeeper	Fort Buchanan Golf Club	(809) 273-3980	31 years
Tony Perez	Chief, Environmental Division	DPW	(809) 273-3508	13 years
Felix Mariani	Environmental Protection Specialist	DPW	(809) 273-3508	1 year
Angel Menendez	Technical Consultant	Environmental Resource Associates (ERA)	(809) 370-2233	3 years
Adolfo Moreno-Español	Chief, Real Estate Office	USACE, San Juan	(809) 729-6904	20 years
Benito Colón Del Toro	Geologist, Permits and Engineering Section	EQB	(809) 766-2817	2 years
Isaac L. Blount	Service Station Manager	EQB	(809) 792-4297	2 years
John Calderon	Executive Vice President	AES International	(809) 753-3431	2 years
Ady Padan	President	AES International	(809) 753-3431	2 years

Table 2-5
INTERVIEWS OF ADJACENT PROPERTY PERSONNEL
CONDUCTED DECEMBER 1995

NAME	TITLE	ORGANIZATION	TELEPHONE NUMBER	PERIOD ASSOCIATED WITH AREA OR FACILITY
Benito Colón Del Toro	Geologist, Permits and Engineering Section	EQB	(809) 766-2817	2 years

2.1.6 Visual Inspections

As required by CERCLA 120(h)(4)(A)(iv) and (v) and DOD guidance, a visual inspection of the real property and properties immediately adjacent to the property was conducted and is addressed in this EBS report. On-site visual inspections of the installation property and adjacent properties were conducted by the Woodward-Clyde field team during the period of November 28 through December 21, 1995. Visual inspections conducted by the field team included grounds, buildings, structures, and equipment. Inspection methods included visual inspections from automobiles and surveys conducted during site walks. Visual inspections were also performed on adjacent properties. These properties were mainly examined from automobiles within a half-mile radius of the installation. To ensure the visual inspections were thorough, standardized visual inspection forms were created and utilized. A sample visual inspection form is presented in Appendix D.

2.1.7 Title Documents

CERCLA 120(h)(4)(A)(ii) and DOD guidance require a review of the "recorded chain of title documents regarding the real property." For the EBS, tract maps and title and transfer documents were reviewed to identify the prior property owners at the time of transfer to the U.S. Army. The majority of the property associated with Fort Buchanan was received from the commonwealth of Puerto Rico by cession in 1927. Additional properties were deeded from private individuals. The purpose of this review is to collect additional information concerning the prior use and environmental condition of the property at the time of transfer to the U.S. Army. Previous ownership and the dates of transfer are included in Appendix E.

3.0 PROPERTY CHARACTERIZATION

This section presents an overview of past and current operations at Fort Buchanan and a discussion of potential environmental contamination associated with these operations. It provides a description of the installation facilities and addresses past and current waste management practices at Fort Buchanan.

3.1 PROPERTY OVERVIEW

Historic land uses of Fort Buchanan have been researched and documented by the USACE and its contractors. Information was collected through record searches, interviews, and map reviews. In addition, this section contains a general description of each facility within the installation as described through existing documentation or site visits.

3.2 INSTALLATION HISTORY AND MISSION

Fort Buchanan was established on a 300-acre tract in 1923 as Camp Buchanan and served as a training area for the 65th Infantry Regiment. It was named Camp Buchanan in honor of Lieutenant Colonel, later Brigadier General, James A. Buchanan, Commander of the Puerto Rico Volunteer Regiment from 1900 to 1903. From 1926 to 1939, Camp Buchanan was used as a maneuver area for U.S. Army and National Guard Troops. It was also used as a Citizen’s Military Training Camp. Camp Buchanan was redesignated as Fort Buchanan on May 1, 1940, and during World War II it served the Antilles Command as a supply depot, an induction center, and a training area. Permanent supply facilities and a temporary barracks were constructed (U.S. USACE 1991a; Harland Barthelomew & Associates, Inc. 1994; Environmental Science and Engineering, Inc. 1984).

In the 1940s, Fort Buchanan grew to 1,514 acres after the 65th Infantry Regiment returned from the European Theater of Operations. During the post-World War II period, the installation was reduced to its present size of 746 acres. On August 23, 1966, Fort Buchanan closed with the deactivation of the Antilles Command. It then became the Naval Supply Annex San Juan until it was returned to the U.S. Army in December 1971. On July 1, 1973, Fort Buchanan was reassigned to FORSCOM and, as a result of realignment and closure studies conducted in 1976, it became a sub-installation of Fort McPherson, Georgia in October 1977 (USACE 1991a; Environmental Science and Engineering, Inc. 1984). Since 1977, Fort Buchanan has provided administrative and logistical support to active duty and reserve components in Puerto Rico and the U.S. Virgin Islands. Support functions include planning and preparation for mobilization and deployment of Reserve Component Forces in Puerto Rico and the U.S. Virgin Islands; and the planning, coordination, and execution of all U.S. Army-related anti-terrorism counteractions on the island. Upon mobilization, Headquarters, Fort Buchanan commands, operates, and administers the installation as a mobilization station. Headquarters provides support to all assigned, attached, or tenant units or activities within the Caribbean region, unless they are supported by another command. Fort Buchanan provides support to a total of 85,725 personnel, the majority of which do not reside at Fort Buchanan (Harland Barthelomew & Associates, Inc. 1994).

Fort Buchanan also provides family housing and support facilities for service personnel and authorized federal employees. The family housing areas, which have been identified by BRAC as being subject to transfer or lease, were mainly constructed in the 1940s and 1950s. Personnel services and community support facilities for retired service personnel and dependents of deceased military personnel are also provided (Harland Barthelomew & Associates, Inc. 1994).

3.3 DESCRIPTION OF FACILITIES

Community facilities and recreational uses are situated in the northern, central, and eastern parts of the installation. The PX, commissary, community club, medical center, and bank form a community center in the northern part of the installation near the rear gate. Located at the center of the installation is family housing, recreational areas, dependent schools, and dental facilities. A golf course, bowling center, physical fitness center, youth activities center, and auto hobby shop are located in the eastern portion of the installation (Harland Barthelomew & Associates, Inc. 1994). Facilities identified at the time of the EBS field investigation as being subject to transfer or lease were the family housing areas known as Coconut Grove, Buchanan Heights, Las Colinas, and Coqui Gardens.

Table 3-1 lists the existing tenant missions located at Fort Buchanan.

Table 3-1
EXISTING TENANTS

UNIT IDENTIFICATION CODE	UNIT
WOU828	Headquarters USA Garrison

W3QM03	Health Clinic Tenants
W3QM05	Dental Clinic
GE1001	Nonappropriated Fund Morale Welfare Recreation Fund
WOU803	Full Time Contract Administration
IOU815	U.S. Postal Service
W3QM04	Veterinary Branch
IOU813	Antilles Consolidated School
032801	Army and Air Force Exchange System Main Store
DCSR54	Defense Commissary Agency (DECA) Commissary
W7PAA	National Guard U.S. Purchasing and Fiscal Office
W3LD15	3rd Military Police Group U.S. Army Criminal Investigation Command
WBU61A	902 Military Intelligence Headquarters and Headquarters Company Group
W49U04	1st Army Regional Training Team (Readiness Group [RG])
W4MOIC	Personal Support Element (RG)
W4MTA6	Reserve Support Group (RG)
W49002	Director of Finance and Accounting Services Indianapolis
USAF10	U.S. Air Force Liaison Office
IOU 16	Department of Justice
IOU822	U.S. Customs
SOU805	Carlson Wagonlit Travel
IOU801	Internal Revenue Service
IOU802	Immigration and Naturalization Services
XXXXX	Banco Popular
	Reserve Units:
W7REAA	Headquarters, 65th Army Reserve Command
WZL899	6 Auxiliary Headquarters Detachment Brigade (Field Exercise)
WZMK99/	348 Auxiliary Battalion (CS FE) 6th Brigade
WRONAA	338 FI Battalion Finance
W4MOAA	Army Reserve Personnel Center Liaison Office
WVE8AA	407th Medical Company (AMB)
WRYAAO	A Company 448th Engineering Battalion

Table 3-1
(Continued)

UNIT IDENTIFICATION CODE	UNIT
WRYATO	Headquarters Support Company 448th Engineering Battalion
WRYABO	B Company, 448th Engineering Battalion Combat
WSKVAA	301 Military Police CPT SPT

WVHMA1	276 Maintenance Company (DS) Detachment 1
WSZ2AA	268 Transportation Company Light Truck 5 Ton
WZN9AA	973 Quartermaster Company Field Services GS
W3EN08	AMSA 161 DS/GS

Table 1-2 lists the geographic areas, and Figure 1-2 illustrates the location of the geographic areas. Table 3-2 (following Section Three) presents a listing of existing facilities at Fort Buchanan.

3.3.1 U.S. Army Reserve Army Maintenance Support Activity

The USAR AMSA Center is located on the eastern edge of West Gate Industrial Park. As part of this EBS, a site visit was conducted in December 1995. Additionally, an interview was conducted and several documents were reviewed. AMSA has a gas station with two 5,000-gallon diesel USTs and a 600-gallon MOGas AST. The two 5,000-gallon diesel USTs were installed in 1986. These two tanks were precision tightness tested and passed (Timothee n.d.). The two 5,000-gallon diesel USTs are registered with EQB; however, the registration expired in October 1995 (USAEHA 1995).

Two USTs with a capacity of 5,300 gallons of gasoline were removed from a location east of the elevated car/truck ramps near Building 653 in 1986. Soil samples collected were below the Underground Storage Tank Control Program (USTCP) permitted limits (Environmental Service and Technology Corporation 1994). EQB received a closure report for the two 5,300-gallon gasoline USTs and in a letter dated December 9, 1994, EQB stated that the tanks have been removed from the USTCP active data system (Junta de Calidad Ambienta 1994). There has been no documented release of petroleum product associated with these USTs.

3.3.2 Southwest Undeveloped Area

The Southwest Undeveloped Area is comprised of approximately 55 acres with no permanent structures. It is located along the southwestern boundary of the installation. A service road crosses the area and connects to the installation perimeter road. The southern part of an old landfill is located within this geographic area.

An active dump site, centrally located within this geographic area, receives only grass clippings and yard waste. This area was created following the disassembly of a U.S. Navy communications antennae. No hazardous materials were observed at this site.

3.3.3 South Undeveloped Area

The South Undeveloped Area is comprised of approximately 46 acres and is centrally located along the southern boundary of the installation. This area consists largely of undeveloped land, with a few permanent buildings. Table 3-3 lists the facilities located in the South Undeveloped Area.

Table 3-3
SOUTH UNDEVELOPED AREA FACILITIES

FACILITY	YEAR CONSTRUCTED	PAST USE	CURRENT USE
141	1988	7,000 kilovolt (kv) Substation	7,000 kv Substation
S-180	1945	Facilities Engineer Storehouse	Storage General Purpose
254	1942	Water Tank Storage	Water Tank Storage
255	1950	Valve House	Valve House
291	1985	Kennel	Kennel
S-292	1990	Chapel Annex	Veterinary Facility
293	1992	Explosives Storage Building	Explosives Storage Building
1292	1973	Playground	Playground

The military police (MP) dog kennel and the installation veterinary facility are located within the northern portion of this geographic area.

Building 293 is an ordnance storage facility for the Provost Marshal (PM) Office. This building was constructed in 1992. No ammunition is currently disposed of on the installation (Harland Barthelomew & Associates, Inc. 1994).

3.3.4 Southeast Undeveloped Area

The Southeast Undeveloped Area is comprised of approximately nine acres and is located along the southeastern boundary of the installation. This area is undeveloped, and there are no permanent structures. A chain link fence exists south of the Antilles Intermediate School (AIS) road and Coqui Gardens Family Housing Area to deter access to the Southeast Undeveloped Area.

A previously rumored chemical burial site is partially located within this geographic area and is described separately in Section Four.

3.3.5 North Undeveloped Area

The North Undeveloped Area is comprised of approximately eight acres and is located along the installation boundary north of the USARC in an area known as "haystack hills." This area is contained by a chain link fence to deter access and preserve slope stability. This area is largely undeveloped; however, it does contain a 500,000-gallon capacity reserve water storage tank and associated valve house. These facilities are described in Table 3-4.

Table 3-4
NORTH UNDEVELOPED AREA FACILITIES

FACILITY	YEAR CONSTRUCTED	PAST USE	CURRENT USE
384	1948	Water Reservoir Valve House	Water Reservoir Valve House
385	1948	Water Storage Tank	Water Storage Tank

3.3.6 Golf Course Area

The Golf Course Area is comprised of approximately 90 acres and is located in the northeastern portion of the installation. The golf course, Maxie Williams Jr. Ballfield, and the haystack hills located to the north are the major land components of this area. Table 3-5 lists the facilities located in the Golf Course Area.

Table 3-5
GOLF COURSE AREA FACILITIES

FACILITY	YEAR CONSTRUCTED	PAST USE	CURRENT USE
25	1992	Sentry Station	Sentry Station
28	1963	MP Administration Building	MP Administration Building
138	1958	Contained 2 large boilers to power the former laundry facility (Building 137)	Golf Course Maintenance Building (Cart House)
156	1955	Waiting Shelter	Waiting Shelter
T-158	1955	Waiting Shelter	Waiting Shelter
163	1952	Sewage Pumping Station	Sewage Pumping Station
S-165	1961	Waiting Shelter	Waiting Shelter
S-166	1961	Public Toilet	Public Toilet

S-171	1944	Golf Club House	Office Building
172	1994	Golf Club House	Golf Club House
181	1947	Bath House	Bath House
182	1962	Dugout	Dugout
T-184	1981	Judge’s Tower	Judge’s Tower
T-185	1962	Refreshment Stand	Refreshment Stand
191	1962	Dugout	Dugout
194	1944	Baseball Field	Baseball Field

Unexploded ordnance was unearthed during utility construction near the Maxie Williams Jr. Ballfield in 1984 and 1985. Approximately five separate rounds, 6 inches in diameter and 18 to 24 inches long, were identified. The ordnance were suspected to be of World War II vintage. The Fort Buchanan Environmental Division notified the proper authorities and explosive ordnance personnel removed the artillery shells. No investigations were conducted within this area to further identify the presence of other such unexploded ordnance.

This geographic area is associated with the following operations and issues pertaining to Building 138, which is used for golf course maintenance activities:

1. During the visual inspection of Building 138, two vent pipes and possible fill ports were observed on the south side of the building. An interview revealed that the ports are no longer used; however, up until approximately five years ago, following heavy rainfall events, suspected petroleum product would be discharged from the western potential fill port that has a broken cap. When metal pipe was inserted into the western potential fill port, approximately six feet of a petroleum-based sludge was observed.

2. North of Building 138 was a tri-purpose AST that was used to supply fuel to golf carts and maintenance equipment. This tank was operable for approximately two years and contained 300 gallons of diesel, 300 gallons of a gasoline and oil mixture, and 500 gallons of MOGas. This tank resided on an unbermed concrete hardstand located approximately ten feet south of the open-banked stormwater drainage. The AST was removed in 1973 (Gawarecki 1995j).

3. Pesticides and herbicides were stored within Building 138 until 1985. A pesticide and herbicide mixing area was located on a 5 foot by 5 foot unbermed concrete

slab that was used from 1975 until approximately 1985. An interview revealed that when pesticides were mixed at this location, spills resulted in runoff into the open-banked stormwater drainage located approximately 20 feet north of this site. In October 1991, EQB referred to this area as Area of Concern (AOC) 1 (Cabrera 1991).

4. In 1972, a 10,000-gallon heating oil UST was removed from the north side of Building 138. At the time of this tank removal, EQB did not require closure plans for USTs (Lozier 1990a). This was a storage tank for fuel that powered the boilers in Building 138. These boilers supplied power to the former quartermaster laundry and dry cleaning operations in former Building 137. Building 137 was used from 1940 until approximately 1969 for laundry and dry cleaning and as a warehouse from 1969 until it was demolished in approximately 1980.

3.3.7 School Area

The School Area is comprised of approximately 52 acres and is located in the south-central portion of the installation. This geographic area contains the Antilles Elementary School (AES), Antilles Middle School (AMS), and the Antilles High School (AHS). The area also contains a running track, softball field, and school playgrounds.

School building construction for the southwestern portion of the elementary school appears to have encroached on the historical boundary of the old landfill. This landfill is described in Section Four. No hazardous materials were observed within this landfill; however, an interview with former base personnel indicated that materials such as paint cans and oil drums may have been disposed of in the landfill. Table 3-6 lists the facilities located in the School Area.

Table 3-6
SCHOOL AREA FACILITIES

FACILITY	YEAR CONSTRUCTED	PAST USE	CURRENT USE
392	1972	Playground	Playground
1029	1954	AES Administration	AES Administration
1030 to 1033	1954	AES Classroom	AES Classroom
1034	1975	AES Maintenance Building	AES Maintenance Building
1035 to 1036	1954	AES Classroom/Cafeteria	AES Classroom/Cafeteria
1037 to 1039	1962	AES Classroom	AES Classroom

T-1040	1984	AES Relocatable Classroom	AES Relocatable Classroom
1041	Unknown	AES Bathroom and Handicapped Bathroom	AES Bathroom and Handicapped Bathroom
1042	1980	AES Classroom	AES Classroom
S-1043	1987	AES Gymnasium	AES Gymnasium
T-1046	1984	AES Relocatable Classroom	AES Relocatable Classroom
1047	1988	AES Storage	AES Storage
1048	1988	AES Storage	AES Storage
T-1049 to T-1053	1984	AES Relocatable Classroom	AES Relocatable Classroom
T-1054	1984	AES Permanent Bathroom	AES Permanent Bathroom
1048	1990	Open Field	AHS Gymnasium
1049	1990	Open Field	AHS Classroom
1050	1990	Open Field	AHS Mechanical Room
Unknown	1990	Open Field	AHS Flammable Storage Area
1051	1990	Open Field	AHS Cafeteria
1052	1990	Open Field	AHS Auditorium
T1066	1990	Open Field	AHS Relocatable Storage

Table 3-6
(Continued)

FACILITY	YEAR CONSTRUCTED	PAST USE	CURRENT USE
1061	1992	Former AMS	AMS Gymnasium
1063	1992	Former AMS	AMS Classroom
1065	1992	Former AMS	AMS Classroom
1067	1992	Former AMS	AMS Industrial Arts
1069	1992	Former AMS	AMS Media Room
1071	1992	Former AMS	AMS Administration
1073	1992	Former AMS	AMS Classroom
1075	1992	Former AMS	AMS Classroom
1077	1992	Former AMS	AMS Cafeteria and Music Room

3.3.8 Intermediate School Area

The Intermediate School Area is comprised of approximately 21 acres and is located south of the golf course along the eastern boundary of the installation. The area is associated with the intermediate school but also contains other buildings. The former AHS was located here until construction of the new AHS was completed in 1990. Table 3-7 lists the facilities located in the Intermediate School Area.

Table 3-7
INTERMEDIATE SCHOOL AREA FACILITIES

FACILITY	YEAR CONSTRUCTED	PAST USE	CURRENT USE
T-8	1945	Credit Union	Credit Union
13	1941	AHS Storage	AIS Storage
15	1941	AHS Maintenance Shop	AIS Maintenance Shop
16	1941	Chlorination Building	Chlorination Building
S-18	1966	AHS Flammable Storage Building	AIS Flammable Storage Building
19	1941	Administrative	AIS Superintendent Office
S-21	1959	USAR Classrooms	General Storage Building
T-30	Unknown	Unknown	ACSS Computer Operations
36	1966	Storage Shed	Storage Shed
73	1962	AHS Classroom	AIS Classroom
74	1962	AHS Administration Building	AIS Administration Building
75	1962	AHS Classroom	AIS Classroom
76	1962	AHS Cafeteria	AIS Cafeteria
77	1962	AHS Library	AIS Library

Table 3-7
(Continued)

FACILITY	YEAR CONSTRUCTED	PAST USE	CURRENT USE
78 to 83	1962	AHS Classroom	AIS Classroom
85	1962	AIS Gymnasium	AIS Gymnasium
T-87	Unknown	ACSS Equal Employment Opportunity Office (EEO)	ACSS EEO Office
T-88 to T-89	1987	AHS Classroom	AIS Classroom
T-90	Unknown	AHS Bathroom	AIS Bathroom
T-91 to T-97	1987	AHS Classroom	AIS Classroom
T-98	Unknown	AHS Freezer Room	AIS Freezer Room
T-99	Unknown	AHS Bathroom	AIS Bathroom

3.3.9 500 Area

The 500 Area is comprised of approximately 106 acres and is located along the western boundary of the installation. It is bordered to the north by El Toro Creek and to the south by the Coconut Grove Family Housing Area and the AMS. This geographic area contains recreational, maintenance, and supply/storage areas. The Puerto Rico Army National Guard leases a large portion of this geographic area. Table 3-8 lists the facilities located in the 500 Area.

Table 3-8
500 AREA FACILITIES

FACILITY	YEAR CONSTRUCTED	PAST USE	CURRENT USE

1	1976	Helipad	Helipad
3	1975	Picnic Shelter	Picnic Shelter
20	Unknown	ACSS Paint Storage Building	ACSS Paint Storage Building
500	1947	Vehicle Bridge	Vehicle Bridge
501	1975	Bank	Bank
504	1947	Administration and General Purpose	Administration and General Purpose
505	1982	Public Bathroom	Public Bathroom
S-507	1947	General Purpose Warehouse	General Purpose Warehouse
S-509	1947	General Purpose Warehouse	General Purpose Warehouse
S-511 to S-512	1947	General Purpose Warehouse	General Purpose Warehouse
S-514	1947	General Purpose Warehouse	General Purpose Warehouse
515	1981	Chlorine Building	Chlorine Building
517	1947	Cold Storage	Cold Storage

Table 3-8
(Continued)

FACILITY	YEAR CONSTRUCTED	PAST USE	CURRENT USE
S-518	1947	Clinic Without Beds	Clinic Without Beds
S-519	1990	Health Clinic Annex	Health Clinic Annex
S- 521 to S-523	1947	General Purpose Warehouse	General Purpose Warehouse
S-525	1947	General Purpose Warehouse	General Purpose Warehouse
S-527	1947	General Purpose Warehouse	General Purpose Warehouse
S-528	1991	Vehicle Maintenance Shop	Vehicle Maintenance Shop
538	1977	Wash Platform	Wash Platform
539	1947	Pesticide Storage Building	Arms Building
540	Unknown	Administration General Purpose	Administration General Purpose
541	1993	National Guard Warehouse	National Guard Warehouse
S-551	1985	Insect Storage Building	Insect Storage Building
T-552	1967	Dispatch Office	Dispatch Office
T-553	1990	Flammable Storage	Flammable Storage
S-556	1947	Facilities Engineer Facility	General Purpose Storage
T-558	1987	Flammable Storage	Flammable Storage
S-559	1974	Public Toilet	Public Toilet
T-560	1959	Picnic Shelter	Picnic Shelter
S-563	Unknown	Warehouse	Warehouse
S-566	1947	ACSS Vehicle Maintenance Shop	ACSS Administration Building
S-569	Unknown	ACSS Lounge/Locker Room	ACSS Lounge/Locker Room
S-570	1988	Flammable Storage Building	Flammable Storage Building
571 to 574	1974	Football Fields	Football Fields
575	1977	Running Track	Running Track
576	1994	Warehouse	Warehouse
578	1993	Transformer	Transformer

T-599	1980	Parallel Bars	Parallel Bars

3.3.10 600 Area

The 600 Area is comprised of approximately 121 acres and is located in the northern portion of the installation. This area contains supply/storage areas and community facilities such as the commissary and the PX. The rear entrance of Fort Buchanan is also located in this geographic area. Table 3-9 lists the facilities located in the 600 Area.

Table 3-9
600 AREA FACILITIES

FACILITY	YEAR CONSTRUCTED	PAST USE	CURRENT USE
602	1943	Vehicle Bridge	Vehicle Bridge
603	1941	Vehicle Bridge	Vehicle Bridge
604	1942	General Purpose Warehouse	General Purpose Warehouse
605	1942	Storage Building	Commissary
606	1942	Storage Building	Main Exchange
607	1942	Storage Building	Exchange Warehouse
608	1942	Storage Building	General Purpose Warehouse
610 to 612	1942	Storage Building	Exchange Warehouse
613	1942	Storage Building	Class VI Store
614-616	1942	Storage Building	General Purpose Warehouse
S-617	1942	Storage Building	Commissary
618	1955	Storage Building	Commissary
624	1957	Storage Building	Commissary
660	1982	Storage Building	Community Club
662-663	1982	750 kv Transformer	750 kv Transformer
664	1987	300 kv Transformer	300 kv Transformer
665	1987	Sentry Station	Sentry Station
670	1987	Administration and General Purpose	Administration and General Purpose
T-671	1988	Administration and General Purpose	Administration and General Purpose

A petroleum release from the Amelia Industrial Park, which is an adjacent property, is currently being investigated by EQB. This release traverses within an open-banked stormwater drainage located within the northeast portion of this geographic area. This issue is described separately in Section Four.

There are three monitoring wells (installed in March 1995) located south of Building 618 and north and northeast of Building 610. Benzene was detected at a maximum concentration of 226 ppb in a groundwater sample collected from the monitoring well located south of Building 618. The maximum concentration was detected in the sample collected on April 27, 1995. This issue is described further in Sections 4.1.11 and 4.3.1.2.

3.3.11 300 Area

The 300 Area is comprised of approximately 43 acres and is centrally located within the installation. This geographic area contains community facilities such as the fort headquarters, child care center, dental clinic, and the PX gas station. Table 3-10 lists the facilities located in the 300 Area.

Table 3-10
300 AREA FACILITIES

FACILITY	YEAR CONSTRUCTED	PAST USE	CURRENT USE
S-312	1947	Unknown	Dental Clinic
313	1982	Public Toilet	Public Toilet
348	1962	Mess Hall	Child Support Center
349 to 350	1987	Flag Pole	Flag Pole
351	1993	Storage Shed	Storage Shed
352	Unknown	Parking Shelter	Parking Shelter
360	1973	Softball Field	Softball Field
362	1947	Foot Bridge	Foot Bridge
363	1947	Ground Storage Tank	Ground Storage Tank
364	1938	Vehicle Bridge	Vehicle Bridge
T-366 to 367	1983	Bench Shelter	Bench Shelter
368	1983	Footbridge	Footbridge
369	1957	Tennis Court	Tennis Court
370	1965	Dugout	Dugout
371	1947	Water Pump House	Water Pump House
374	1944	Basketball Court	Basketball Court
375	1973	Softball Field	Softball Field
376	1942	Phone Exchange Building	Phone Exchange Building
377	1965	Dugout	Dugout
T-378	1983	Picnic Shelter	Picnic Shelter
380	1957	Auto Service Station	Auto Service Station
S-381	1966	Branch Exchange	Branch Exchange
383	1947	Storage Shed	Storage Shed
S-386 to S-387	1947	PX Gas Station	PX Gas Station
388	1958	Foot Bridge	Foot Bridge
S-389	1986	Storehouse	Storehouse
390	1948	Enlisted Barracks	Enlisted Barracks
391	1992	Volleyball Court	Volleyball Court

392	1972	Playground	Playground
395	1983	Public Toilet	Public Toilet
T-396	1983	Picnic Shelter	Picnic Shelter
T-397	1983	Picnic Shelter	Picnic Shelter

Table 3-10
(Continued)

FACILITY	YEAR CONSTRUCTED	PAST USE	CURRENT USE
T-398	1983	Picnic Shelter	Picnic Shelter
S-399	1948	Post Headquarters	Post Headquarters
832	1973	Playground	Playground
1325	1958	Foot Bridge	Foot Bridge
1327	1959	Foot Bridge	Foot Bridge

Building 379 was formerly located north of the PX gas station (Building 380). This building was associated with the gas station and was demolished in 1994. No information was obtained identifying the past practices at this building and its potential for petroleum product release based on its association with the gas station. The EBS site observation revealed no evidence of a release.

3.3.12 200 Area

The 200 Area is comprised of approximately 29 acres and is located north of the South Undeveloped Area. Administration services such as the MP, chapel, readiness groups, and library are the primary components of this geographic area. Table 3-11 lists the facilities located in the 200 Area.

Table 3-11
200 AREA FACILITIES

FACILITY	YEAR CONSTRUCTED	PAST USE	CURRENT USE
183	1988	Post Chapel	Post Chapel
186	1947	Basketball Court	Basketball Court
S-192 to S-193	1947	Administration General Readiness Group	Administration General Readiness Group
S-202 to S-204	1959	Administration General Purpose	Administration General Purpose
S-206	1947	PM Administration Building	PM Administration Building
S-212	1947	PM Administration Building	PM Administration Building
S-214	1959	PM Administration Building	PM Administration Building
S-218 to	1947	Administration General	Administration General Purpose

S-220		Purpose	
S-223	1947	Main Library	Main Library

Table 3-11
(Continued)

FACILITY	YEAR CONSTRUCTED	PAST USE	CURRENT USE
S-224 to S-225	1947	Administration General Purpose	Administration General Purpose
S-227 to S-228	1947	Administration General Purpose	Administration General Purpose
S-231	1947	Administration General Purpose	Administration General Purpose
S-233	1943	Religious Education Facility	Religious Education Facility
T-266	1986	Dispatch Building	Dispatch Building
267	1988	Storage Shed	Storage Shed
362	1947	Foot Bridge	Foot Bridge
911	1947	Vehicle Bridge	Vehicle Bridge

3.3.13 1300 Area

The 1300 Area is comprised of approximately 21 acres and is located south of the North Undeveloped Area. This geographic area contains the USARC and some community facilities such as the fire station. Table 3-12 lists the facilities located in the 1300 Area.

Table 3-12
1300 AREA FACILITIES

FACILITY	YEAR CONSTRUCTED	PAST USE	CURRENT USE
176 to 177	1942	Administration General Purpose	Administration General Purpose
1300 to 1301	1941	Bachelor Officers' Quarters	Bachelor Officers' Quarters
1302 to 1303	1941	Administration General Purpose	Administration General Purpose
1304	1941	Senior Enlisted Quarters	Senior Enlisted Quarters
1305 to 1313	1941	USARC Building	USARC Building
1314	1941	Senior Enlisted Quarters	Senior Enlisted Quarters
1315	1941	Guest House	Guest House
1316 to 1320	1941	USARC Buildings	USARC Buildings
1321	1941	Enlisted Barracks, Transit	Enlisted Barracks, Transit
1322 to 1324	1941	USARC Buildings	USARC Buildings
1326	1978	N/O Parking	N/O Parking

3.3.14 Recreational Area

The Recreational Area is comprised of approximately 40 acres and is located south of the golf course. This geographic area is used primarily for recreational purposes; however, it does have limited community facilities and administration services. Table 3-13 lists the facilities located in the Recreational Area.

Table 3-13
RECREATIONAL AREA FACILITIES

FACILITY	YEAR CONSTRUCTED	PAST USE	CURRENT USE
T-65	1991	Picnic Shelter	Picnic Shelter
66	1944	Pool	Pool
67	1957	Bathhouse	Bathhouse
68	1944	Water Pump Station	Water Pump Station
69	1980	Public Toilet	Public Toilet
70	1970	Wading Pool	Wading Pool
71	1983	Waiting Shelter	Waiting Shelter
119	1950	Guest House	Guest House
S-136	1988	Youth Center	Youth Center
T-139	1988	Picnic Shelter	Picnic Shelter
148	1987	Youth Center	Youth Center
149	1987	225 kv Transformer	225 kv Transformer
S-151	1988	Snack Bar	Snack Bar
S-152	1990	Administration General Purpose	Administration General Purpose
153 to 154	1965	Dugout	Dugout
155	1950	Softball Field	Softball Field
S-159	1988	Auto Hobby Shop	Auto Hobby Shop
167	1992	Physical Fitness Center	Physical Fitness Center
168	1992	Bowling Center	Bowling Center
169	1993	Transformer	Transformer
173	1944	Volleyball Court	Volleyball Court
174 to 175	1944	Basketball Courts	Basketball Courts
179	1957	Picnic Shelter	Picnic Shelter
S-180	1945	Facilities Engineer Storehouse	Storage General Purpose
T-198	1980	Refreshment Stand	Refreshment Stand

An investigation and excavation of two USTs and associated piping located east of Building 152 were conducted in January 1996. The investigation indicated that the USTs were larger capacities than originally predicted, and an associated concrete vault was also observed. This site was again backfilled and is awaiting further negotiations with the Department of Contracting prior to continuation of excavation activities. The site has been determined to have had a petroleum release and is described separately in Section Four.

3.3.15 Coconut Grove Family Housing Area

The Coconut Grove Family Housing Area and the surrounding area totals approximately 33 acres and is located on the west side of the installation. The area consists of Coconut Grove (formerly known as Officer Wherry Housing), which contains 141 houses with 2- and 3-bedroom units. Currently, central air conditioning is being added to the homes. The Fort Buchanan Post Office is located on the northeast corner of the area, and a children's playground is located on the west side of the geographic area. Prior to construction of family housing, this land was undeveloped. Table 3-14 lists the facilities located in the Coconut Grove Family Housing Area.

Table 3-14
COCONUT GROVE FAMILY HOUSING AREA FACILITIES

FACILITY	YEAR CONSTRUCTED	PAST USE	CURRENT USE
1098	1986	Playground	Playground
1099	1971	Basketball Court	Basketball Court
1100	1973	Playground	Playground
1101 to 1241	1955	Family Housing	Family Housing
1242	1955	Post Office	Post Office

3.3.16 Buchanan Heights Family Housing Area

The Buchanan Heights Family Housing Area and the surrounding area totals approximately 15 acres and is located south of the Coconut Grove Housing Area. This family housing was formerly known as Capehart Housing and contains 98 housing units. Eighty-eight of the units are 2- and 3-bedroom quadplexes and 10 of the units are 4-bedroom duplexes. There are two children's playgrounds in this area, both of which are located in the northwest section of this geographic area. Prior to construction of family housing, this land was undeveloped. Table 3-15 lists the facilities located in the Buchanan Heights Family Housing Area.

Table 3-15
BUCHANAN HEIGHTS FAMILY HOUSING AREA FACILITIES

FACILITY	YEAR CONSTRUCTED	PAST USE	CURRENT USE
746	1941	Administration General Purpose	Central Intelligence Division
1000 to 1009	1941	Family Housing Non-Commissioned Officer (NCO)	Family Housing
1010 to 1026	1964	Family Housing NCO	Family Housing
1028	1973	Playground	Playground
1044 to 1045	1986	Playground	Playground

3.3.17 Las Colinas Family Housing Area

The Las Colinas Family Housing Area and the surrounding area totals approximately 34 acres and is located in the south-central portion of the installation. This family housing was formerly known as the Field Grade Officers' Housing and contains thirty-two 2-, 3-, and 4-bedroom family houses. Prior to construction of family housing, this land was undeveloped. Table 3-16 lists the facilities located in the Las Colinas Family Housing Area.

Table 3-16
LAS COLINAS FAMILY HOUSING AREA FACILITIES

FACILITY	YEAR CONSTRUCTED	PAST USE	CURRENT USE
800	1948	Family Housing Detached Garage	Family Housing Detached Garage
801 to 831	1948	Family Housing	Family Housing

3.3.18 Coqui Gardens Family Housing Area

The Coqui Gardens Family Housing Area totals approximately 16 acres and is located in the southeast portion of the installation. This family housing was formerly known as NCO Wherry Housing and consists of forty-eight 2-, 3-, and 4-bedroom duplex units. Prior to construction of family housing, this land was undeveloped. Table 3-17 lists the facilities located in the Coqui Gardens Family Housing Area.

Table 3-17
COQUI GARDENS FAMILY HOUSING AREA FACILITIES

FACILITY	YEAR CONSTRUCTED	PAST USE	CURRENT USE

1243 to 1290	1955	NCO Wherry Housing	Family Housing

3.4 FACILITY SUPPORT ACTIVITIES

Fort Buchanan has been a military installation since 1923. The U.S. Navy occupied the installation from 1966 until 1971. Records describing facility support activities prior to the 1971 were not located. Information regarding the activities described in the following sections was compiled from interviews, site inspections, and document research.

3.4.1 Hazardous Materials/Waste Management

The predominant wastes generated at Fort Buchanan are waste petroleum oil and lubricants. The majority of these wastes are generated by the auto hobby shop (Building S-159) and the DPW complex (Building 556).

Used oil is collected at a location southeast of Building T-552. Eight 55-gallon drums of used oil were observed during the EBS visual inspection of the DPW. The drums had secondary containment; however, stained soils were observed in the area. An interview with base personnel revealed that this secondary containment equipment has only recently been installed because of the soil staining observed, and housekeeping practices in this area need improvement (Mariani 1995b). Sampling and analysis to characterize the environmental condition of this site has not been conducted. Used oil is sent to Roosevelt Roads DRMO for disposal.

During a visual inspection of the DPW compound, soil staining was observed in the area where the heavy equipment is stored south of Building 522. The equipment is stored in a three-walled structure with a dirt floor. Various petroleum products have leaked from the equipment stored in this area. Sampling and analysis to characterize the environmental condition of this site has not been conducted.

North of the auto hobby shop (Building S-159) is a fenced storage yard containing seventeen 55-gallon drums of used oil and approximately five 55-gallon drums of “Super-wash,” which is used in the parts washer. The drums of used oil were bulging and leaking. The path the used oil created flows east to west across the pavement and into a grassy area and potentially down a hill into the stormwater system. Stressed vegetation was observed near the edge of the pavement.

None of the drums had secondary containment. Sampling and analysis to characterize the environmental condition of this site has not been conducted.

One 55-gallon drum of used oil and one 55-gallon drum of used coolant, also without secondary containment, are stored on the west side of Building T-159. Individuals who use the facility add fluids to these drums as they are drained from their vehicles. According to shop personnel, oils are spilled on a daily basis but only in small quantities. The used oil consists of a combination of used motor oil, brake fluid, transmission fluid, power steering fluid, and other oils that are removed from vehicles. When these drums are full, they are moved to the storage yard. Significant staining was observed around the base of these two drums. Sampling and analysis to characterize the environmental condition of this site has not been conducted.

Used oil and coolant are sent to Roosevelt Roads DRMO for disposal.

Past practices may have included the burial of small quantities of hazardous materials. Two rumored pesticide and/or chemical/hazardous materials burial sites are located at Fort Buchanan. One, located in the 500 Area (Section 4.1.3, Solid Waste Management Unit 3), has been investigated and recommended for no further action. The second, located south of Building S-18 in the Intermediate School Area (Section 4.2.3, Potential Hazardous Materials Burial Site), has not been investigated.

3.4.2 Solid Waste/Landfill Management

There is one landfill and four dump sites located within the installation as listed in Table 3-2. The landfill, referred to as the old landfill on Figures 1-2 and 5-1, is located immediately south of the elementary school and southeast of the Buchanan Heights Family Housing Area. The old landfill was never permitted and was not used as a sanitary landfill for the disposal of hazardous wastes. At one time it was used for the disposal of grass clippings and yard debris, but this practice stopped in January 1993 (Harland Barthelomew & Associates, Inc. 1994). Currently it is used for the temporary storage of organic yard debris until such time when an accumulated amount will be transported to the landfill in San Juan. This information conflicts with an interview with former base personnel stating that uncontrolled dumping of paint cans, oil drums, and other possibly hazardous materials were periodically observed within the landfill. It is unclear when the landfill was in operation. Materials were removed when they were observed;

however, the landfill was not monitored. In August 1979, sawdust was used to clean up a diesel spill and then containerized in plastic bags and placed in the landfill (Padilla 1979). Investigations to confirm the presence or absence of hazardous materials within the landfill have not been conducted.

Currently, all other solid wastes generated at the installation are removed from the installation by private contractors and transported on a regular basis to the landfill in San Juan.

Table 3-18
LANDFILL AND DUMP SITES

DISPOSAL SITE TYPE	GEOGRAPHIC AREA	TYPE OF DEBRIS DISPOSED
Landfill (Old Landfill)	Southwest Undeveloped Area and School Area	Grass clippings; yard debris; and paint cans, oil drums, and other hazardous materials (possible).
Active Dump Site	Southwest Undeveloped Area	Debris from the dismantling of a former U.S. Navy communications antennae (this debris has been removed). A visual inspection identified only yard clippings and yard debris (Waldmann 1995h).
Active Controlled Dump Site	School Area	Grass clippings and yard debris.
Former Uncontrolled Dump Site	Buchanan Heights Family Housing Area	Construction debris and grass clippings/yard debris (debris has been removed).
Former Uncontrolled Dump Site	Northwest of Los Colinas Family Housing	Construction debris and grass clippings/yard debris (debris has been removed).

3.4.3 Storage Tanks

There are 16 active petroleum storage tanks located on Fort Buchanan. Six storage tanks are scheduled for removal and seven storage tanks have been removed and are awaiting closure. A complete listing of these tanks is provided in Section 2.1.2.1.

3.4.3.1 Active Storage Tanks

A 5,000-gallon gasoline UST located south of the fuel pump in Building T-552 services DPW vehicles and equipment. This UST was installed in 1988 and replaced a former 5,000-gallon UST at the same site. There has been no documented release associated with either of these USTs.

Two 10,000-gallon gasoline USTs located northwest of Building 380 service the PX gas station. These USTs were installed in 1990 and replaced three 10,000-gallon USTs from the same location. The three former tanks were not documented to have leaked. The current tanks are of double-walled steel construction and equipped with all required leak detection systems. There has been no documented release of petroleum product associated with these USTs.

Fuel tanks used for emergency generators are located near the buildings listed in Table 3-19.

Table 3-19
FUEL TANKS USED FOR EMERGENCY GENERATORS

BUILDING NUMBER	STORAGE TANK
540	350-gallon diesel UST
660	500-gallon diesel UST
399	200-gallon diesel UST
163	200-gallon diesel UST
212	25-gallon diesel AST
376	200-gallon diesel UST

There was no evidence obtained during the EBS site visit of past releases associated with these fuel tanks.

Additionally, two 5,000-gallon diesel USTs and one 400-gallon MOGas AST are in use at Building 654, and one 300-gallon diesel AST is in use at Building 168.

3.4.3.2 Storage Tanks Scheduled for Removal

A 275-gallon diesel UST located north of Building 376 was used to service the former telecommunications facility located within this building. The installation date of the tank is unknown. This UST is no longer used and is scheduled for removal in 1996. An estimated 40 gallons of product remains in the tank. There had been no documented release of petroleum product associated with this UST (U.S. Army 1995c). During excavation of this UST, holes through the tank and petroleum odors were noted. A soil sample collected from the bottom of the excavation pit contained an elevated level of TPH (approximately 300 mg/kg). The site was backfilled and is awaiting further guidance from EQB prior to further site cleanup.

Two USTs, estimated volumes of 5,000 gallons and 10,000 gallons, and piping were discovered during removal activities of a 10,000-gallon UST near Building 152. The contents of these USTs are unknown. Due to the limited information available for the maintenance facility, it is not known whether additional USTs are located nearby. These USTs and associated piping are scheduled to be removed in 1996, and a site investigation (SI) to determine if additional tanks are present will also be conducted (U.S. Army 1995b). The investigation indicated that the USTs were larger capacities than originally predicted, and an associated concrete vault was also observed. This site was again backfilled and is awaiting further negotiations with Department of Contracting prior to continuation of excavation activities.

Additionally, a 1,000-gallon diesel UST located at Building 746 and two 5,500 to 6,000-gallon diesel USTs located at Building 138 are scheduled to be removed, and closure plans are in progress.

3.4.3.3 Storage Tanks Removed and Awaiting Closure

A 300-gallon diesel UST was removed from a location immediately south of Building 20 in 1995. This tank supplied fuel for the emergency generator of the former communications facility (Building 20). The installation date of the tank is unknown. Elevated levels of TPH were detected (5,570 mg/kg) from the bottom of the excavation pit. Excavated soils were remediated and the site was backfilled (Environmental Resource Associates [ERA] 1995b). A closure plan has been submitted to EQB and is awaiting approval.

Three 25,000-gallon USTs located west of Building 541 were discovered during the grading of an area designated for a parking lot west of the newly constructed National Guard Warehouse (Building 541). The tanks were removed by a Puerto Rico National Guard contractor in February 1992. The soils removed were stockpiled to the west of the excavation site (McCarthy 1992). In April 1992, another subcontractor collected soil samples from the bottom of the excavation and the stockpiled soil. The samples collected from the bottom of the excavation were reported below EQB and EPA corrective action levels; however, two of the four samples collected from the stockpiles exceeded EQB TPH levels of 100 mg/kg (TPH of 140 and 220 mg/kg) (McCarthy 1992). EQB recommended that the stockpiled soil be further aerated to allow TPH to volatilize, and further sampling was required. At an undetermined date, the stockpiled soils were removed from this location and placed west of Building S-514. In October 1992, the aerated soil was resampled and one (TPH of 130 mg/kg) of four samples exceeded the EQB TPH criteria (Law Environmental 1992b). Further information confirming closure at this site was not available.

Two USTs located southeast of Building 615 (one 5,000-gallon diesel and one 5,000-gallon gasoline) were removed in 1995. Elevated levels of TPH and BTEX were reported in the soils. The excavated soils were bioremediated, and the site was backfilled with the remediated soil. Three monitoring wells have been installed to monitor groundwater in the area of the UST excavation (ERA 1995b). A closure plan has been submitted to EQB and is awaiting approval.

In February 1995, one 10,000-gallon UST with unknown contents was removed from a location east of Building 152. This site was previously used as a motor pool maintenance facility. At the time of excavation, one of the six samples collected contained 129 mg/kg for TPH which exceeded the EQB action level of 100 mg/kg for TPH (ERA 1995b). The excavation was backfilled, but it is unclear where the backfill came from. A closure plan has been submitted to EQB for the removal of this tank.

3.4.3.4 Storage Tanks Having Received Closure

In 1972, a 10,000-gallon heating oil UST was removed from the north side of Building 138. At the time this tank was removed, EQB did not require closure plans for this UST (Lozier 1990a). No information was available about the condition of the tank or soils around the tank when it was excavated. This was a storage tank for fuel that powered the boilers in Building 138. These boilers supplied power to the former quartermaster laundry and dry cleaning operations in former Building 137. Building 137 was used from 1940 to approximately 1969 for laundry and dry cleaning; after 1969 it was used as a warehouse until it was demolished in approximately 1980 (Gawarecki 1995j).

3.4.3.5 Inactive Storage Tanks

A 1,000-gallon dual purpose AST located east of Building 566 has not been used since 1988 when a new 5,000-gallon UST was installed at the DPW. The tank formerly contained 500 gallons of diesel and 500 gallons of gasoline to service ACSS maintenance equipment. This AST is constructed on a bermed hardstand, and there has been no documented release of petroleum product associated with this AST.

A 400-gallon diesel AST formerly servicing a boiler is located north of Building 390. The AST has secondary containment, and there has been no documented release of petroleum product associated with this AST.

3.4.3.6 Potential Storage Tanks Identified During the EBS Field Investigation

Two vent pipes and possible fill ports were observed during a visual inspection on the south side of Building 138. Based upon this observation, two potential USTs of unknown capacity and contents may be located south of Building 138. An interview revealed that the ports are no longer used, but approximately five years ago, following heavy rainfall, suspected petroleum product was discharged from the western potential fill port, which had a broken cap. The released product flowed into a concrete-lined drainage ditch that wraps around the western side of the building and connects with an open-banked stormwater drainage channel flowing to the east. Maintenance personnel stated that when the broken cap was replaced the release of the petroleum product ceased (Gawarecki 1995j). During the EBS field inspection in December 1995, the cap was again broken on the potential fill port. When a metal pipe was inserted into the potential fill port, approximately six feet of a petroleum-based sludge was observed. Installation personnel indicated at the time that product no longer flows from the port during heavy rainfall. An investigation of this area was initiated in July 1996. The location and orientation of two 5,500 to 6,000-gallon tanks containing fuel oil have been determined. Stained soil was observed indicating the tanks have leaked. The tanks are scheduled to be removed, and a closure plan is in progress.

A vent pipe and possible fill port were observed south of Building 746, which is currently occupied by the Department of Justice (DOJ). The presence of the UST was not known prior to the EBS site visit (Waldmann 1995h). An investigation of this area was initiated in July 1996. The location and orientation of a 1,000-gallon tank containing diesel fuel have been determined. Stained soil was not observed, and pressure testing indicated that the integrity of the tank was good. The tank is scheduled to be removed. Closure will depend on the analytical results of confirmation samples collected from beneath the tank and regulatory approval.

A tri-purpose AST that was used to supply fuel to golf carts and maintenance equipment was located north of Building 138. This tank was operable for approximately two years and contained 300 gallons of diesel, 300 gallons of a gasoline and oil mixture, and 500 gallons of

MOGas. This tank resided on an unbermed concrete hardstand located approximately ten feet south of the open-banked stormwater drainage (Gawarecki 1995j). The AST was removed in 1973. Little information was available about this AST; however, no spills have been documented.

3.4.4 Injection Wells

Injection wells are not known to exist on Fort Buchanan.

3.4.5 Drinking Water Management

Potable water for the installation is supplied by PRASA. There are two water storage tanks at Fort Buchanan with a combined capacity of 1.5 million gallons. Both are installed at an elevation of 160 feet MSL. One tank, with a one million gallon capacity, is located near the Field Grade Officers' Housing area and the second, with a 500,000 gallon capacity, is located in the haystack hills north of the USAR area.

One chlorination station (Building 31) is located near the main gate and is used only in the event that the PRASA water supply is not properly chlorinated. Information regarding quantities of chlorine used at this site was not available.

3.4.6 Stormwater Management

Stormwater drainage flows on Fort Buchanan are generally from southeast to northwest. Except for the eastern portion of the base, all the stormwater drainage eventually ends up in the Malaria Control Canal via El Toro Creek and its tributaries, other drainage lines, or by flowing directly into the canal. El Toro Creek is the main drainage system for Fort Buchanan and runs in a northwesterly direction from its entrance near the south gate, located within the Coqui Gardens Family Housing Area, to its exit near the rear gate. El Toro Creek is a rectangular concrete-lined ditch from the northern base boundary to a storm drain structure near the existing PM office. From the PM office south to the south gate of Fort Buchanan, the channel is not lined. The Malaria Control Canal is located outside of the base and it runs from southwest to north. The canal begins north of the De Diego Expressway (Road PR-22) and ends in Bay View where the stormwater is pumped into the San Juan Bay (Harland Barthelomew & Associates, Inc. 1994).

A Group Permit Application 382 was filed for an NPDES stormwater permit for 65 FORSCOM facilities, as well as for other U.S. Army installations under other major commands, particularly the U.S. Army Training and Doctrine Command (CH2M Hill 1994c). Fort Buchanan was reportedly listed on this permit; however, at the time of the EBS field inspection this permit had not been received.

3.4.7 Sewage Treatment

Fort Buchanan is served by the Puerto Nuevo Wastewater Treatment Plant (WWTP) located at the southeast end of San Juan Bay. The wastewater generated at Fort Buchanan is discharged into PRASA’s wastewater collection system via a 42-inch reinforced concrete pipe trunk sewer, which is owned and operated by PRASA. The collection system contains approximately eleven miles of underground pipe, mostly concrete. Pipe sizes range from 6 inches to 24 inches. The majority of the pipe is more than 40 years old. Infiltration/inflow problems have been reported during and after rainfall events. Repairs to this line are made as needed (Harland Barthelomew & Associates, Inc. 1994).

On February 21, 1996, personnel from the EQB Water Quality Division performed an inspection of El Toro Creek. A broken concrete pipe that runs parallel to El Toro Creek was discharging sewage water into the creek. A dye test was performed at the manhole near the point of entrance to Fort Buchanan, which resulted in the determination that the pipe was connected to the sewer system (Perez 1996a). PRASA, which is responsible for inspections and maintenance of the sewer lines, was informed of the situation. Repairs to sections of the line have been completed and the replacement of some sections are planned or in progress (Section 4.5.2).

Currently, there is one active pumping station and force main. The station is located northeast of the golf course maintenance building and it has an approximate pumping capacity of 500 gpm. The intermediate school and Coqui Gardens Family Housing Area are served by this pumping station (Harland Bartholomew & Associates, Inc. 1994).

The remainder of the Fort Buchanan service area is served by a gravity wastewater collection system with the exception of Buildings 604 and 615, which are served by septic tanks.

Several facilities have floor drains that discharge to oil/water separators (OWS) and ultimately to the sanitary sewer system. These facilities are listed in Table 3-20.

Table 3-20
FACILITIES DISCHARGING TO OIL/WATER SEPARATORS

FACILITY	TYPE OF DISCHARGE	DISCHARGE LOCATION
Building S-528 (OMS)	Petroleum products (OWS)	Sanitary sewer
Building S-159	Petroleum products (OWS)	Sanitary sewer
Facility 538	Petroleum products (OWS)	Sanitary sewer
Building 380	Petroleum products (OWS)	Sanitary sewer

3.4.8 Electrical Power Generation

Electrical power is furnished to Fort Buchanan by the Puerto Rico Electric Power Authority (PREPA). The base receives its power from PREPA's steam plant located in Puerto Nuevo and the Caparra Substation. Fort Buchanan has one substation located west of South Gate Road across from the Coqui Gardens Housing Area. It consists of two 3-phase transformers, each rated at 7,500 kv. Three 13.2-kv 3-phase feeder lines provide secondary distribution to the post from this substation (Harland Barthelomew & Associates, Inc. 1994).

3.4.9 Fire Training

There are no formal fire training activities known to have been conducted at Fort Buchanan. Buildings with no further use, such as the former chapel and Building 357, which were no longer structurally sound, were set on fire and used by the fire department for training exercises.

3.4.10 Medical Activities

Buildings S-514 and S-519 comprise the medical clinic, which is located in the north-central portion of the installation. A dental clinic (Building S-312) is centrally located on the installation, southwest of the headquarters building. Medical wastes generated at the clinics include sharps (e.g., needles, syringes), laboratory wastes (e.g., gloves, drapes), and pathological wastes (e.g., body tissues, body fluids). Medical wastes are stored in an approved medical waste shed located at the medical clinic. KTR, a local contractor, picks up the medical wastes for disposal in an infectious waste landfill (CH2M Hill 1995).

3.4.11 On-Site Housing

The four on-site housing areas located on the southern portion of the installation were identified at the time of the EBS field investigation as the only BRAC properties subject to transfer or lease. These housing areas include:

Buchanan Heights Family Housing	Buildings 1000 to 1026
Coconut Grove Family Housing	Buildings 1101 to 1241
Las Colinas Family Housing	Buildings 801 to 831
Coqui Gardens Family Housing	Buildings 1243 to 1290

3.5 SENSITIVE ENVIRONMENTS

The issues that will need to be addressed pertaining to sensitive environments at Fort Buchanan include National Environmental Policy Act (NEPA), natural resources, and cultural resources requirements. Currently, there are no areas within the BRAC property subject to transfer or lease that would require protection because of the presence of natural or cultural resources.

Natural resource issues that may need to be addressed at Fort Buchanan include the Endangered Species Act, wetlands, migratory birds, unique ecosystems, and impact(s) on the local environment.

A unique ecosystem present at Fort Buchanan can be found in association with the mogotes or "haystack hills." The importance of this ecosystem as floral and faunal habitats has only recently been recognized. Because of their steep topography, these areas have limited agricultural potential and use for construction. Thus, in many of these mogotes, flora and fauna remain well preserved. This, in turn, has led to the finding of threatened or endangered species on a considerable number of these formations (USACE and Matosantos 1995).

A formal survey for threatened or endangered species, both floral and faunal, has not been completed at Fort Buchanan. A survey for the Puerto Rican Boa was conducted in January of 1996 and a flora survey is planned for March 1996. Species known to occur in the Fort Buchanan area that are listed as federally or commonwealth protected, threatened, or endangered include: Puerto Rican Boa (*Epicrates inornatus),* Lucia (*Mabuya maybuya sloanii), Daphnosis* *helleriana,* Vahl's Boxwood *(Buxus vahlii),* Palo de Ramòn *(Banara vanderbiltii), Goetza elegans, Cornutia obovata, Schoefia arenariaz,* Palo de Rosa *(Ottoschulzia rhodoxylon), Zanthoxylum thomasianum, Peperomia wheeleri, Tectaria estremera,* and *Adiantum vivesii* (USACE and Matosantos 1995). A survey for threatened or endangered species will need to be completed prior to the proposed parcelization of the installation. The native vegetation areas south of all four family housing areas may support listed species. However, none of these areas has been identified by BRAC as subject to transfer or lease.

The National Wetlands Inventory Map (U.S. Fish and Wildlife 1983) does not identify any significant wetlands on Fort Buchanan, and Fort Buchanan is not within the 100-year floodplain.

A cultural resources survey conducted at Fort Buchanan in 1977 and 1978 identified one site as significant and eligible for nomination to the National Register of Historic Places. This site (Cueva Canejas), located north of the golf course within the mogotes, was inadvertently destroyed on July 31, 1984 by blasting conducted by an adjacent property owner.

Records indicate that Fort Buchanan is a participant of a Memorandum of Agreement between DOD and the National Trust for Historic Preservation (Brown 1994a) and also operates under a Programmatic Memorandum of Agreement for the demolition of World War II temporary buildings (Brown 1994b).

Table 3-2
EXISTING FACILITIES
FORT BUCHANAN, PUERTO RICO

BUILDING NUMBER	SQUARE FEET	ACRES	YEAR CONSTRUCTED	BUILDING DESIGNED USE	BUILDING CURRENT USE
1	843	0.019	1976	Helipad	Helipad
3	896	0.021	1975	Picnic Shelter	Picnic Shelter
7	1,916,640	44.000	1942	Golf Course	Golf Course
T-8	1,380	0.032	1945	Credit Union	Credit Union
13	546	0.013	1941	AHS Storage	AIS Storage
15	546	0.013	1941	AHS Maintenance Shop	AIS Maintenance Shop
16	128	0.003	1941	Chlorination Building	Chlorination Building
S-18	47	0.001	1966	AHS Flammable Storage Building	AIS Flammable Storage Building
19	2,304	0.053	1941	Administration	AIS Superintendent Office
20	Unknown	Unknown	Unknown	ACSS Paint Storage Building	ACSS Paint Storage Building
S-21	13,575	0.312	1959	Unknown	General Storage Building
25	160	0.004	1992	Sentry Station	Sentry Station
26	Unknown	Unknown	1993	Facility Sign	Facility Sign
28	256	0.006	1963	MP Administration Building	MP Administration Building
T-30	1,620	0.037	Unknown	Unknown	ACSS Computer Operations
31	284	0.007	1994	Water Pump	Water Pump
36	144	0.003	1966	Storage Shed	Storage Shed
T-65	1,024	0.024	1991	Picnic Shelter	Picnic Shelter
66	Unknown	Unknown	1944	Pool	Pool
67	1,440	0.033	1957	Bathhouse	Bathhouse
68	140	0.003	1944	Water Pump Station	Water Pump Station
69	132	0.003	1980	Public Toilet	Public Toilet
70	478	0.011	1970	Wading Pool	Wading Pool
71	132	0.003	1983	Waiting Shelter	Waiting Shelter
73	4,176	0.096	1962	AHS Classroom	AIS Classroom
74	3,558	0.082	1962	AHS Administration Building	AIS Administration Building
75	4,848	0.111	1962	AHS Classroom	AIS Classroom
76	7,633	0.175	1962	AHS Cafeteria	AIS Cafeteria
77	3,983	0.091	1962	AHS Library	AIS Library
78 to 83	17,238	0.396	1962	AHS Classroom	AIS Classroom
85	13,851	0.318	1962	AHS Gymnasium	AIS Gymnasium
T-87	1,675	0.038	Unknown	ACSS EEO Office	ACSS EEO Office
T-88 to T-89	3,310	0.076	1987	AHS Classroom	AIS Classroom
T-90	350	0.008	Unknown	AHS Bathroom	AIS Bathroom
T-91 to T-97	11,725	0.269	1987	AHS Classroom	AIS Classroom
T-98	914	0.021	Unknown	AHS Freezer Room	AIS Freezer Room
T-99	385	0.009	Unknown	AHS Bathroom	AIS Bathroom
119	21,870	0.502	1950	Guest House	Guest House
120	72	0.002	1989	Waiting Shelter	Waiting Shelter
S-136	3,496	0.080	1988	Youth Center	Youth Center
138	5,686	0.131	1958	Golf Course Maint. Bldg.	Golf Course Maintenance Building
T-139	256	0.006	1988	Picnic Shelter	Picnic Shelter
141	Unknown	Unknown	1988	7,000 kv Substation	7,000 kv Substation
148	7,761	0.178	1987	Unknown	Youth Center
149	Unknown	Unknown	1987	225 kv Transformer	225 kv Transformer
S-151	1,152	0.026	1988	Snack Bar	Snack Bar
S-152	10,084	0.231	1990	Administration General	Administration General Purpose

Table 3-2
(Continued)

BUILDING NUMBER	SQUARE FEET	ACRES	YEAR CONSTRUCTED	BUILDING DESIGNED USE	BUILDING CURRENT USE
				Purpose	
153 to 154	374	0.009	1965	Dugout	Dugout
155	10,338	0.237	1950	Softball Field	Softball Field
156	144	0.003	1955	Waiting Shelter	Waiting Shelter
157	696	0.016	1940	Vehicle Bridge	Vehicle Bridge
T-158	400	0.009	1955	Waiting Shelter	Waiting Shelter
S-159	4,781	0.110	1988	Auto Hobby Shop	Auto Hobby Shop
163	189	0.004	1952	Sewage Pumping Station	Sewage Pumping Station
S-165	96	0.002	1961	Waiting Shelter	Waiting Shelter
S-166	80	0.002	1961	Public Toilet	Public Toilet
167	17,000	0.390	1992	Physical Fitness Center	Physical Fitness Center
168	20,780	0.477	1992	Bowling Center	Bowling Center
169	Unknown	Unknown	1993	Transformer	Transformer
S-171	690	0.016	1944	Golf Club House	Golf Club House
172	3,752	0.086	Unknown	Golf Club House	Golf Club House
173	6,100	0.140	1944	Volleyball Court	Volleyball Court
174 to 175	10,634	0.244	1944	Basketball Courts	Basketball Courts
176 to 177	2,700	0.062	1942	Administration General Purpose	Administration General Purpose
179	2,637	0.061	1957	Picnic Shelter	Picnic Shelter
S-180	451	0.010	1945	Facilities Engineer Storehouse	General Purpose Warehouse
181	1,454	0.033	1947	Bath House	Bath House
182	225	0.005	1962	Dugout	Dugout
183	4,116	0.094	1988	Post Chapel	Post Chapel
T-184	96	0.002	1981	Judge's Tower	Judge's Tower
T-185	120	0.003	1962	Refreshment Stand	Refreshment Stand
186	4,860	0.112	1947	Basketball Court	Basketball Court
191	234	0.005	1962	Dugout	Dugout
S-192 to S-193	4,976	0.114	1947	Administration General Purpose	Administration General Purpose
194	Unknown	Unknown	1944	Baseball Field	Baseball Field
T-198	108	0.002	1980	Refreshment Stand	Refreshment Stand
S-202 to S-204	8,325	0.191	1959	Administration General Purpose	Administration General Purpose
S-206	2,475	0.057	1947	PM Administration Building	PM Administration Building
S-212	2,475	0.057	1947	PM Administration Building	PM Administration Building
S-214	2,550	0.059	1959	PM Administration Building	PM Administration Building
S-218 to S-220	7,155	0.164	1947	Administration General Purpose	Administration General Purpose
S-223	4,227	0.097	1947	Main Library	Main Library
S-224 to S-225	6,709	0.154	1947	Administration General Purpose	Administration General Purpose
S-227 to S-228	4,962	0.114	1947	Administration General Purpose	Administration General Purpose
S-231	2,224	0.051	1947	Administration General Purpose	Administration General Purpose
S-233	2,224	0.051	1943	Religious Education Facility	Religious Education Facility
254	Unknown	Unknown	1942	Water Tank Storage	Water Tank Storage
255	243	0.006	1950	Valve House	Valve House
T-266	150	0.003	1986	Dispatch Building	Dispatch Building
267	51	0.001	1988	Storage Shed	Storage Shed

Table 3-2
(Continued)

BUILDING NUMBER	SQUARE FEET	ACRES	YEAR CONSTRUCTED	BUILDING DESIGNED USE	BUILDING CURRENT USE
291	340	0.008	1985	Kennel	Kennel
S-292	1,800	0.041	1990	Unknown	Veterinary Facility
293	25	0.001	1992	Explosives Storage Building	Explosives Storage Building
S-312	2,974	0.068	1947	Unknown	Dental Clinic
313	117	0.003	1982	Public Toilet	Public Toilet
348	8,256	0.190	1962	Child Support Center	Child Support Center
349 to 350	Unknown	Unknown	1987	Flag Pole	Flag Pole
351	576	0.013	1993	Storage Shed	Storage Shed
352	Unknown	Unknown	Unknown	Parking Shelter	Parking Shelter
360	14,306	0.328	1973	Softball Field	Softball Field
362	51	0.001	1947	Foot Bridge	Foot Bridge
363	6,923	0.159	1947	Ground Storage Tank	Ground Storage Tank
364	150	0.003	1938	Vehicle Bridge	Vehicle Bridge
T-366 to 367	72	0.002	1983	Bench Shelter	Bench Shelter
368	27	0.001	1983	Footbridge	Footbridge
369	1,439	0.033	1957	Tennis Court	Tennis Court
370	180	0.004	1965	Dugout	Dugout
371	105	0.002	1947	Water Pump House	Water Pump House
374	8,909	0.205	1944	Basketball Court	Basketball Court
375	14,306	0.328	1973	Softball Field	Softball Field
376	3,013	0.069	1942	Phone Exchange Building	Phone Exchange Building
377	180	0.004	1965	Dugout	Dugout
T-378	320	0.007	1983	Picnic Shelter	Picnic Shelter
380	1,710	0.039	1957	Auto Service Station	Auto Service Station
S-381	1,166	0.027	1966	Branch Exchange	Branch Exchange
383	69	0.002	1947	Storage Shed	Storage Shed
384	243	0.006	1948	Water Reservoir Valve House	Water Reservoir Valve House
385	Unknown	Unknown	1948	Water Storage Tank	Water Storage Tank
S-386 to S-387	882	0.020	1947	PX Gas Station	PX Gas Station
388	72	0.002	1958	Foot Bridge	Foot Bridge
S-389	800	0.018	1986	Storehouse	Storehouse
390	29,014	0.666	1948	Enlisted Barracks	Enlisted Barracks
391	Unknown	Unknown	1992	Volleyball Court	Volleyball Court
392	Unknown	Unknown	1972	Playground	Playground
395	300	0.007	1983	Public Toilet	Public Toilet
T-396	320	0.007	1983	Picnic Shelter	Picnic Shelter
T-397	320	0.007	1983	Picnic Shelter	Picnic Shelter
T-398	320	0.007	1983	Picnic Shelter	Picnic Shelter
S-399	18,047	0.414	1948	PX	Post Headquarters
500	255	0.006	1947	Vehicle Bridge	Vehicle Bridge
501	1,750	0.040	1975	Bank	Bank
504	9,300	0.213	1947	Administration and General Purpose	Administration and General Purpose
505	114	0.003	1982	Public Bathroom	Public Bathroom
S-507	10,000	0.230	1947	General Purpose Warehouse	General Purpose Warehouse
S-509	10,000	0.230	1947	General Purpose Warehouse	General Purpose Warehouse
S-511 to S-512	20,000	0.459	1947	General Purpose Warehouse	General Purpose Warehouse
S-514	10,000	0.230	1947	General Purpose Warehouse	General Purpose Warehouse
515	140	0.003	1981	Chlorination Building	Chlorination Building
517	16,733	0.384	1947	Cold Storage	Cold Storage
S-518	6,500	0.149	1947	Clinic w/o Beds	Clinic w/o Beds
S-519	2,000	0.046	1990	Health Clinic Annex.	Health Clinic Annex.
S- 521 to S-523	30,000	0.689	1947	General Purpose Warehouse	General Purpose Warehouse

Table 3-2
(Continued)

BUILDING NUMBER	SQUARE FEET	ACRES	YEAR CONSTRUCTED	BUILDING DESIGNED USE	BUILDING CURRENT USE
S-525	10,000	0.230	1947	General Purpose Warehouse	General Purpose Warehouse
S-527	10,000	0.230	1947	General Purpose Warehouse	General Purpose Warehouse
S-528	10,089	0.232	1991	Unknown	Vehicle Maintenance Shop
538	1,330	0.031	1977	Vehicle Wash Rack	Vehicle Wash Rack
539	6,000	0.138	1947	Pesticide Storage Building	Arms Building
540	11,940	0.274	Unknown	Unknown	Administration and General Purpose
541	50,250	1.154	1993	National Guard Warehouse	National Guard Warehouse
S-551	800	0.018	1985	Insect Storage Building	Insect Storage Building
T-552	159	0.004	1967	Unknown	Dispatch Office
T-553	179	0.004	1990	Flammable Storage Building	Flammable Storage Building
S-556	54,879	1.260	1947	Facilities Engineer Facility	Storage General Purpose
T-558	338	0.008	1987	Flammable Storage Building	Flammable Storage Building
S-559	460	0.011	1974	Public Toilet	Public Toilet
T-560	1,920	0.044	1959	Picnic Shelter	Picnic Shelter
S-563	10,000	0.230	Unknown	Warehouse	Warehouse
S-566	11,615	0.267	1947	ACSS Vehicle Maint Shop	ACSS Administration Building
S-569	Unknown	Unknown	Unknown	ACSS Lounge/Locker Room	ACSS Lounge/Locker Room
S-570	360	0.008	1988	Flammable Storage Building	Flammable Storage Building
571 to 574	25,600	0.588	1974	Football Fields	Football Fields
575	Unknown	Unknown	1977	Running Track	Running Track
576	3,200	0.073	1994	Warehouse	Warehouse
577	Unknown	Unknown	Unknown	Unknown	Unknown
578	25	0.001	1993	Transformer	Transformer
T-599	200	0.005	1980	Parallel Bars	Parallel Bars
602	609	0.014	1943	Vehicle Bridge	Vehicle Bridge
603	993	0.023	1941	Vehicle Bridge	Vehicle Bridge
604	23,528	0.540	1942	Warehouse	General Purpose Warehouse
605	27,368	0.628	1942	Warehouse	Commissary
606	51,451	1.181	1942	Warehouse	Main PX
607	20,468	0.470	1942	Warehouse	Exchange Warehouse
608	20,468	0.470	1942	General Purpose Warehouse	General Purpose Warehouse
610 to 612	61,404	1.410	1942	General Purpose Warehouse	Exchange Warehouse
613	20,468	0.470	1942	General Purpose Warehouse	Class VI Store
614 to 616	48,028	1.103	1942	General Purpose Warehouse	General Purpose Warehouse
S-617	952	0.022	1942	General Purpose Warehouse	Commissary
618	28,900	0.663	1955	General Purpose Warehouse	Commissary
624	675	0.015	1957	General Purpose Warehouse	Commissary
653	39,549	0.908	1948	General Purpose Warehouse	Reserve Army Maintenance Shop
654	851	0.020	1948	General Purpose Warehouse	General Purpose Warehouse
655 to 656	8,640	0.198	1948	Grease Rack	Grease Rack
660	40,329	0.926	1982	Community Club	Community Club
662-663	Unknown	Unknown	1982	749 kv Transformer	750 kv Transformer
664	Unknown	Unknown	1984	300 kv Transformer	300 kv Transformer
665	228	0.005	1987	Sentry Station	Sentry Station
670	1,624	0.037	1987	Administration General Purpose	Administration General Purpose
T-671	3,966	0.091	1988	Administration General Purpose	Administration General Purpose
664	Unknown	Unknown	1987	300 kv Transformer	300KV Transformer
746	3,131	0.072	1941	Unknown	Administration General Purpose
800	945	0.022	1948	Family Housing Detached	Family Housing Detached

Table 3-2
(Continued)

BUILDING NUMBER	SQUARE FEET	ACRES	YEAR CONSTRUCTED	BUILDING DESIGNED USE	BUILDING CURRENT USE
				Garage	Garage
801 to 831	80,534	1.849	1948	Field Grade Officers Housing	Las Colinas Housing Area
832	3,626	0.083	1973	Playground	Playground
910 to 911	192	0.004	1947	Vehicle Bridges	Vehicle Bridges
1000 to 1009	48,036	1.103	1941	Capehart Housing	Buchanan Heights Housing Area
1010 to 1026	82,115	1.885	1964	Capehart Housing	Buchanan Heights Housing Area
1028	4,000	0.092	1973	Playground	Playground
1029	3,540	0.081	1954	AES Administration	AES Administration
1030 to 1033	16,027	0.368	1954	AES Classroom	AES Classroom
1034	600	0.014	1975	AES Maintenance Building	AES Maintenance Building
1035 to 1036	14,007	0.322	1954	AES Classroom	AES Classroom
1037 to 1039	16,325	0.375	1962	AES Classroom	AES Classroom
T-1040 , 1046	4,679	0.107	1984	AES Relocatable Classroom	AES Relocatable Classroom
1041	917	0.021	Unknown	AES Bathroom and Handicapped Bathroom	AES Bathroom and Handicapped Bathroom
1042	2,810	0.065	1980	AES Classroom	AES Classroom
S-1043	10,400	0.239	1987	AES Gymnasium	AES Gymnasium
1044 to 1045	8,000	0.184	1986	Playground	Playground
1047	999	0.023	1988	AES Storage	AES Storage
1048	1,600	0.037	1988	AES Storage	AES Storage
1048	16,225	0.372	1990	AHS Gymnasium	AHS Gymnasium
1049	54,064	1.241	1990	AHS Classroom	AHS Classroom
1050	1,140	0.026	1990	AHS Mechanical Room	AHS Mechanical Room
1051	9,520	0.219	1990	AHS Cafeteria	AHS Cafeteria
1052	10,103	0.232	1990	AHS Auditorium	AHS Auditorium
T1066	0	0.000	1990	AHS Relocatable Storage	AHS Relocatable Storage
T-1049 to 1053	9,760	0.224	1984	AES Relocatable Classroom	AES Relocatable Classroom
1054	294	0.007	1984	AES Bathroom	AES Bathroom
1061	11,220	0.258	1992	AMS Gymnasium	AMS Gymnasium
1063	8,466	0.194	1992	AMS Classroom	AMS Classroom
1065	8,466	0.194	1992	AMS Classroom	AMS Classroom
1067	12,332	0.283	1992	AMS Industrial Arts	AMS Industrial Arts
1069	8,200	0.188	1992	AMS Media Room	AMS Media Room
1071	5,806	0.133	1992	AMS Administration	AMS Administration
1073	8,466	0.194	1992	AMS Classroom	AMS Classroom
1075	8,466	0.194	1992	AMS Classroom	AMS Classroom
1077	12,863	0.295	1992	AMS Cafeteria and Music Room	AMS Cafeteria and Music Room
1088 to 1093	Unknown	Unknown	Unknown	Waiting Shelter	Waiting Shelter
1098	Unknown	Unknown	1986	Playground	Playground
1099	3,000	0.069	1971	Basketball Court	Basketball Court
1100	4,000	0.092	1973	Playground	Playground
1101 to 1241	183,822	4.220	1955	Officers Wherry Housing	Coconut Grove Housing Area
1242	885	0.020	1955	Post Office	Post Office
1243 to 1290	109,328	2.510	1955	N.C.O. Wherry Housing	Coqui Gardens
T-1291	Unknown	Unknown	Unknown	Waiting Shelter	Waiting Shelter
1292	9,000	0.207	1973	Playground	Playground
1294	4,000	0.092	1986	Playground	Playground
T-1295	Unknown	Unknown	Unknown	Waiting Shelter	Waiting Shelter
1300 to 1301	17,628	0.405	1941	Bachelor Officers' Quarters	Bachelor Officers' Quarters
1302 to 1303	17,570	0.403	1941	Administration General Purpose	Administration General Purpose
1304	8,785	0.202	1941	Senior Enlisted Quarters	Senior Enlisted Quarters
1305 to 1313	83,458	1.916	1941	USAR Center Building	USAR Center Building

Table 3-2
(Continued)

BUILDING NUMBER	SQUARE FEET	ACRES	YEAR CONSTRUCTED	BUILDING DESIGNED USE	BUILDING CURRENT USE
1314	6,972	0.160	1941	Senior Enlisted Quarters	Senior Enlisted Quarters
1315	6,972	0.160	1941	Guest House	Guest House
1316 to 1320	37,604	0.863	1941	USAR Center Building	USAR Center Building
1321	8,293	0.190	1941	Enlisted Barracks, Transit	Enlisted Barracks, Transit
1322 to 1324	24,390	0.560	1941	USAR Center Building	USAR Center Building
1325	45	0.001	1958	Foot Bridge	Foot Bridge
1326	25,914	0.595	1978	N/O Parking	N/O Parking
1327	33	0.001	1959	Foot Bridge	Foot Bridge

4.0 INVESTIGATION RESULTS

The EBS field investigation was conducted for the entire Fort Buchanan installation. Though Fort Buchanan consists of approximately 746 acres, only approximately 80 acres have been identified as BRAC property subject to transfer or lease. The 80 acres consists of four family housing areas located in the southern portion of Fort Buchanan.

This section describes the results of the EBS investigation. It discusses:

- Sources of potential contamination that have been addressed in prior reports
- Sources of potential contamination that have not been addressed by previous investigations
- Adjacent properties that may be potential sources of contamination to the installation property
- Areas containing contamination substances not regulated by CERCLA (non-CERCLA)
- Remediation activities that have occurred
- Real property within the installation property that will be retained by the U.S. Army

4.1 PREVIOUSLY IDENTIFIED SOURCES OF POTENTIAL CONTAMINATION

Records indicate that six solid waste management units (SWMUs) and three AOCs have been identified at Fort Buchanan (Cabrera 1991). Since the time of this report (Cabrera 1991), five additional sources of potential contamination have been identified. A discussion of each of these sites is provided in the following sections. None of the previously identified or additional sources of potential contamination are expected to directly affect the identified BRAC property.

4.1.1 Solid Waste Management Unit 1

Building 539 received large quantities (a truck load) of pesticides from Fort Brooke in 1968. In 1977, the pesticides, dichlorodiphenyltrichloroethane (DDT) and its breakdown products dichlorodephenyldichloro-ethylene (DDE) and dichlorodiphenyldichloro-ethane (DDD), were moved to Building 596. Approximately 650 gallons of powdered DDT were stored at Building 596. The DDT was reportedly contained in one-pound opaque plastic containers within the

55-gallon metal drums. These drums were reported to be properly sealed and had no signs of spillage or deterioration (U.S. Army Environmental Hygiene Agency [USAEHA] 1988). During a Phase I investigation in June 1989, no pesticides were found in wipe samples collected from the building; however, pesticides were found in soil near the building up to 42.5 ug/g of p,p'-DDT. Soil samples collected during the Phase II investigation reported up to 5 ug/g of p,p'-DDT. A closure plan was submitted to EPA, and closure certification was approved on December 24, 1992.

4.1.2 Solid Waste Management Unit 2

From 1977 until 1981, Building 596 stored approximately 650 gallons of powdered DDT and its breakdown products DDD and DDE. Records indicate that in 1981 DPW personnel moved the pesticides to the Defense Property Disposal Office (DPDO) at Roosevelt Roads Naval Station (USAEHA 1988). Contaminated soils, concrete, and debris associated with this building were properly packaged, shipped, and disposed of as a hazardous waste during three separate removal/excavation actions conducted in July and September of 1990 and in January of 1991. Confirmation samples were taken to verify removal of soil to a proposed action level of 2.0 mg/kg DDT and other associated pesticides (USACE 1992a). A closure plan was submitted to EPA in April 1992, and closure certification was approved on December 24, 1992 (del Valle 1992). This building was later demolished.

4.1.3 Solid Waste Management Unit 3

This SWMU is associated with a rumored pesticide and chemical burial site located near the perimeter road of the western portion of the installation in the 500 Area. Materials were reportedly buried in 1971 at a depth of 30 feet. The burial area is approximately 100 feet long and 40 feet wide (Cabrera 1991).

Geophysical studies and two excavation and sampling events were conducted to characterize the environmental condition of the rumored pesticide and chemical burial site. Chemical and pesticide analysis at this site resulted in no detections. EPA reviewed the *Soil Sampling Program at SWMU 3, Fort Buchanan, Puerto Rico, Final Report* dated February 1993 and recommended no further action concerning the rumored pesticide disposal area (Belling 1995). Subsequent to the recommendation of no further action, installation personnel have requested that Fort Buchanan's permit be downgraded to a small quantity generator versus the current treatment, storage, and disposal permit. EQB has approved the request, and approval from EPA is pending.

4.1.4 Solid Waste Management Unit 4

Several 55-gallon drums containing spent solvents used as a coil cleaner were stored in the southwest portion of the Building 556 yard. These containers were stored on an asphalt pad without an enclosure or release control devices. The solvents stored at this location had a brand name "Vista" and contained hydrogen fluoride. Staining near the drums was observed during the 1990 survey (Cabrera 1991). The period of operation at this storage site is from approximately 1980 to 1990. No additional information regarding this site was obtained. A RCRA Facility Investigation (RFI) was recommended that would also include SWMU 5 and AOC 3 (Cabrera 1991).

4.1.5 Solid Waste Management Unit 5

A PCB storage area approximately 21 feet by 8 feet was located near the northwest side of Building 556. Transformers were stored at this location pending laboratory analytical results of their PCB content, if any. This storage area had an asphalt floor with no roof, walls, or release control devices. The area sloped towards El Toro Creek; however, no sign of a past release was observed. The period of operation of this storage area was from approximately 1979 to 1982 (Cabrera 1991). Additional information regarding this site was not obtained. An RFI study was recommended that would also include SWMU 4 and AOC 3 (Cabrera 1991).

4.1.6 Solid Waste Management Unit 6

A PCB storage area approximately 11 feet by 11 feet with a one-foot concrete curbing and access ramp was located within a wooden building. This facility was used from 1980 to 1982 to store transformers pending laboratory analytical results. Following laboratory analyses, if it was determined that these transformers contained PCBs, they were removed from Fort Buchanan. After approximately five to six transformers accumulated at this location, they were moved off site. A spill of approximately two gallons of transformer fluid occurred at this storage area in June 1982. No additional information regarding this site was obtained. Concrete samples from the Building 556 supply area and PCB storage area were recommended (Cabrera 1991). This site was later destroyed during Hurricane Hugo in 1989, and a new concrete floor was placed over the previous concrete flooring.

4.1.7 Area Of Concern 1

Building S-551 was constructed in 1985 to be used as an entomology building. This building is 45 feet long, 20 feet wide, and 10 feet high; it consists of three sections that have a concrete floor and corrugated zinc roof in common. The eastern portion of the building is the container storage area, and it has an 18-inch concrete bermed perimeter. This container storage area has a chain-link fence on three sides; to control the periodic rainfall accumulations, a drainage pipe and valve have been installed through the concrete berm, discharging to soils south of the building. The middle portion of this building is the pesticide formulating room. A stainless steel double-sink connected to the domestic sewer line is where the powdered pesticides are formulated. No sign of a past release was observed. EQB recommended no further action for this site (Cabrera 1991).

4.1.8 Area Of Concern 2

A pesticide and herbicide mixing area located on a 5 foot by 5 foot unbermed concrete slab north of Building 138 was used from 1975 to approximately 1985. An interview revealed that when pesticides were mixed at this location, spills resulted in runoff into the open-banked stormwater drainage located approximately 20 feet north of this site. In October 1991, EQB (Cabrera 1991) recommended that soil samples be collected from the area around the concrete slab and near the creek (drainage ditch). The report concluded that a release potential with respect to soil, groundwater, and surface water was high due to the lack of a containment system. No samples have been collected in this area.

4.1.9 Area Of Concern 3

A 5,000-gallon gasoline UST located south of the fuel pump in Building T-552 services DPW vehicles and equipment. This UST was installed in 1988 and replaced a former 5,000-gallon UST that had been in operation at the same site since 1965. The former UST was reportedly operating without a permit (Cabrera 1991). There has been no documented release associated with either of these USTs.

The following five sites have been identified as potential sources of contamination since the SWMU report (Cabrera 1991).

4.1.10 65th Army Reserve Command Refueling Area

The 65th Army Reserve Command (ARCOM) conducted refueling operations in an area leased by the National Guard, located south of Building 538. On May 19 and 24, 1995, the Fort Buchanan Environmental Division was informed that a leak had occurred in the refueling area. On May 25, 1995, the Fort Buchanan Environmental Division requested that the 65th ARCOM remove the tank trucks from the area immediately and cease all fueling operations (Oetjen 1995b). The soils beneath the refueling point had received enough fuel to stain an approximate six-foot-square area of soil. The Fort Buchanan Environmental Division sampled the soil and had samples analyzed for BTEX and TPH. The BTEX values were reported below proposed RCRA corrective action levels; however, the TPH was reported as being up to 25,000 mg/kg, which exceeds the EQB criterion of 100 mg/kg (Analytical Environmental Services, Inc. 1995). No remediation of this site has occurred.

4.1.11 600 Area Stormwater Drainage

According to installation personnel, petroleum product has periodically been observed within an open-banked stormwater drainage located in the northwest portion of the 600 Area. No point sources of this material have been noted on Fort Buchanan indicating that this material may have been discharged from an adjacent property. Since 1985, DPW has reported to EPA and EQB that oil and solvents have been discharged into a storm drain in Amelia Industrial Park that drains through Fort Buchanan. The effluent flows north across the 600 Area of Fort Buchanan, under the road PR-28, continuing through some wetlands, and finally into San Juan Bay.

On November 9, 1995, an investigation was performed by the Department of Water Quality at EQB to determine the source of contamination in the 600 Area ditch. It was determined that used oil and water were being dumped down a manhole on street “A” in the Amelia Industrial Park. Smoke and dye tests were used to determine that the sanitary lines were working correctly. Used oil was observed at a grate that discharged to the system at Fort Buchanan. Pan American Grain Manufacturing Company, Inc. was inspected by EQB and it was determined that the discharges came from this facility. In the area of the facility, two diesel ASTs and a tank where used oil is stored were observed. The used oil tank did not have secondary containment. EQB has notified the president of Pan American Grain Manufacturing Company of the deficiencies and requested the implementation of corrective action measures (EQB 1995a).

Benzene was detected at a maximum concentration of 226 ppb in a groundwater sample collected on April 27, 1995 from a monitoring well located south of Building 618. The source of this contamination is unknown; however, installation personnel expressed concern that a potential source of the contamination may be the Caribbean Gulf Refinery Tank Farm located to the southwest of the 600 Area. An upgradient monitoring well (also located in the 600 Area) was dry during the same sampling event and, therefore, not sampled. This issue is discussed further in Section 4.3.1.2.

4.1.12 Building 138

Pesticides and herbicides were formerly stored within Building 138 until the new storage location (S-551) was constructed in 1985. Sampling and analysis to determine whether any releases have occurred within the building have not been conducted.

4.1.13 Used Oil Staging Area

A used oil staging area is located southeast of Building T-552. Eight 55-gallon drums of used oil were observed at this area during the visual inspection of the DPW. The drums had secondary containment; however, stained soils in the area were observed. An interview with base personnel revealed that this secondary containment equipment has only been recently installed because of the observed soil staining.

4.1.14 Heavy Equipment Storage Area

During a visual inspection of the DPW compound, soil staining was observed in the area where the heavy equipment is stored south of Building T-552. This equipment is stored in a three-walled structure with a dirt floor. A release of various petroleum products has resulted from the equipment in this area (Gawarecki 1995r).

4.2 POTENTIAL CONTAMINATION AREAS IDENTIFIED DURING THE EBS INVESTIGATION

Ten potential contamination areas were identified during the EBS investigation. These were largely discovered through interviews with present and former Fort Buchanan personnel. One of the potential contamination areas identified during the EBS investigation may affect BRAC property subject to transfer or lease. This area is associated with the potential UST located south of Building 746. These potential contamination areas are discussed in the following sections.

4.2.1 Building 746

Building 746, located at the southwestern end of the Buchanan Heights Family Housing Area, is currently occupied by DOJ. During a visual survey of the Southwest Undeveloped Area, a vent pipe and possible fill port were observed south of the building. This potential UST is located south of a chain-link fenced-in area. Documentation to confirm the presence of, or identify the size or contents of, this possible UST was not found (Waldmann 1995h). Due to the primary north-northwest regional groundwater flow, this site should be considered upgradient of the Buchanan Heights Family Housing. In July 1996, an investigation of this area was initiated. A UST was identified as containing diesel fuel and having a 1,000-gallon capacity. The tank was pressure tested; results indicated that the tank had not leaked. The tank is scheduled to be removed in mid-November 1996, and closure will depend on the analytical results of confirmation samples collected from beneath the tank and regulatory approval (Mariani 1996c) (Section 4.5.2).

A dated transformer located within the chain-link fenced area was also observed. The transformer identification number is 697597. Records could not be obtained to identify if this transformer had been tested for PCBs. No sign of leaking was observed on the concrete foundation beneath this transformer (Waldmann 1995h). Subsequent to the EBS field investigation, this transformer was sampled (on May 14, 1996) and tested for PCB content. PCBs were not detected in the transformer oil (Rodriguez and Associates 1996).

4.2.2 Old Landfill

A landfill located adjacent to and southeast of the Buchanan Heights Family Housing Area has been identified by present base personnel as having received only yard debris and grass clippings until January 1993 (Harland Barthelomew & Associates, Inc. 1994). The landfill was not considered for further evaluation during the *Hazardous and Toxic Waste Assessment* that was conducted in June 1994 (USACE 1994b). However, an interview with a former base employee identified that uncontrolled dumping of paint cans, oil drums, and other possibly hazardous materials were periodically observed within the landfill. Former base personnel indicated that they removed these materials when they were observed; however, since this landfill was not monitored, hazardous materials may remain. In August 1979, sawdust was used to clean up a diesel spill that was then containerized in plastic bags and placed in the landfill (Padilla 1979). Installation personnel anticipate initiating a focused investigation to confirm the presence or absence of hazardous materials within the landfill and evaluate the potential for releases to groundwater (Section 4.5.3).

4.2.3 Potential Hazardous Materials Burial Site

A rumored hazardous materials burial site is located approximately 30 feet south of Building S-18 in the Intermediate School Area. This site was identified during an interview with high school custodial staff who recall burying unused chemicals from the former high school at this site (Waldmann 1995i). During the visual inspection, the area near the rumored hazardous materials burial site was littered with several paint cans that had been placed over the fence behind Building S-18. Soil sampling and analysis to identify the presence or absence of hazardous materials has not been conducted, but an investigation is planned (Mariani 1996c) (Section 4.5.3).

4.2.4 Building 138

During a visual inspection of Building 138, two vent pipes and possible fill ports were observed on the south side of the building. Due to this observation, two potential USTs of unknown capacity and contents may be located south of Building 138. An interview revealed that the ports are no longer used, but approximately five years ago, following heavy rainfall, suspected petroleum product would be discharged from the western potential fill port that had a broken cap. The released product would flow into a concrete-lined drainage ditch that wraps around the western side of the building and connects with an open-banked stormwater drainage channel flowing to the east. Maintenance personnel stated that when the broken cap was replaced, the release of the petroleum product ceased (Gawarecki 1995j). During the December 1995 field inspection, the cap was again broken on the westernmost potential fill port. During a visual inspection in January 1996, a long metal object was inserted into the broken fill port and approximately six feet of petroleum product was observed.

An investigation of this area was initiated in July 1996. The location and orientation of two 5,500 to 6,000-gallon USTs containing fuel oil have been determined. Visual evidence of leaking (i.e., soil staining) was observed. The tanks are scheduled to be removed and a closure plan is in progress (Section 4.5.2) (Mariani 1996c).

4.2.5 Building 541

The drainage system of the hazardous waste storage area within Building 541 discharges directly to a 55-gallon drum containment system located north of the building. Approximately 75 percent of the 55-gallon drum is submerged within the ground. The secondary containment system consists of a concrete berm with an open polyvinyl chloride (PVC) pipe at its base that discharges to the north (Waldmann 1995f). If there were ever a release within the hazardous waste storage area exceeding the drum containment system, materials would be discharged directly to the soil through the pipe. The soils near the secondary containment drain did not indicate signs of stressed vegetation. No known sampling of soils near this discharge point has been conducted to identify whether a past release of hazardous materials has occurred; however, documentation was obtained that identified a past release associated with this storage area.

4.2.6 Unknown Discharge Point

Two 2-inch PVC pipes located beneath a concrete surface water drainage culvert south of the tennis courts (Facility 369) discharge directly into El Toro Creek (Waldmann 1995e). Documentation was not obtained to identify the use and origin of these pipes.

4.2.7 Building S-563

Building S-563 was used as an auto hobby shop from an undetermined date until the construction of the current auto hobby shop (Building S-159) in 1988. During a visual inspection of the site, discarded auto parts were observed within the stormwater drains located west of the building. Also, a PVC pipe discharges directly into the stormwater drain from the southwest corner of the building. The escort during the visual survey did not know the origin of the PVC piping. Access to the building was not obtained because the lock to the building could not be opened

(Waldmann 1995f). Based on knowledge of activities associated with the current auto hobby shop, and the discarded auto parts observed in the stormwater drain, a potential release of petroleum products may have occurred in this area. Documentation was not available from which to characterize the stormwater drainage system associated with this building.

4.2.8 Small Arms Firing Range

A former small arms firing range may have been located near the western portion of the present golf course driving range (Gawarecki 1995c). Information confirming the presence of the small arms firing range was not obtained.

4.2.9 Building S-159

Two potential contamination areas are associated with Building S-159 (the auto hobby shop). During the EBS site investigation, it was noted that an area north of Building S-159, a fenced storage yard, contained seventeen 55-gallon drums of used oil and approximately five 55-gallon drums of “Super-wash,” which is used in the parts washer. The drums of used oil were bulging and leaking. The path the used oil created flows east to west across the pavement and into a grassy area and potentially down a hill into the stormwater system. Stressed vegetation was observed near the edge of the pavement. None of the drums had secondary containment. DPW personnel indicated that the drums have subsequently been removed. Vermiculite was used to absorb any free oils present on the pavement surface. The pavement surface was than scraped and the wastes disposed of appropriately (Mariani 1996a).

One 55-gallon drum of used oil and one 55-gallon drum of used coolant, also without secondary containment, are stored on the west side of Building S-159. Individuals who use the facility add fluids to these drums as they are drained from their vehicles. According to shop personnel, minor oil spills are common. The used oil consists of a combination of used motor oil, brake fluid, transmission fluid, power steering fluid, and other oils that are removed from vehicles. When these drums are full, they are moved to the storage yard. Significant staining was observed around the base of these two drums. Sampling to characterize the environmental condition of this site has not been conducted (Sheldon 1995f).

4.2.10 The Golf Course and Perimeter Roads

Interviews with base personnel revealed that a common practice was to apply a mixture of used oil, diesel fuel, and herbicides to vegetation. This practice was used up until 15 years ago on the golf course and perimeter roads (Gawaracki 1995i).

4.3 SOURCES OF POTENTIAL CONTAMINATION FROM ADJACENT OR SURROUNDING PROPERTY

Properties adjacent to Fort Buchanan are owned by private industry to the north, east, and west, and consist primarily of private residential areas to the south. Luchetti Industrial Park is located west of Fort Buchanan and includes the Caribbean Gulf Refinery, which is part of Caribbean Petroleum Corporation (CPC). West Gate Industrial Park is located north of Fort Buchanan and Metro Office Park is located east of Fort Buchanan. Amelia Industrial Park is partially surrounded by the northeast portion of Fort Buchanan.

The streets nearest to Fort Buchanan were not labeled on any maps and, therefore, some of the hazardous waste generators in the area might have been overlooked. Records for USTs, ASTs, or air emissions were not available for adjacent properties. Due to the lack of readily available information concerning adjacent properties, Woodward-Clyde extended the search to a half-mile around Fort Buchanan.

Topographic and hydrogeologic information for Fort Buchanan was reviewed to assess potential contamination migration pathways onto Fort Buchanan, including the adjacent properties. This information was used in conjunction with data on potential contamination sources on adjacent and surrounding property to determine if there were any existing or potential environmental impacts on BRAC property from off-site sources. Contamination source data were obtained through record searches, the review of existing environmental reports, personnel interviews, and property site visits. The results of these adjacent property evaluations are described in this section.

According to a report prepared by the USGS, there are two aquifers in the vicinity of Fort Buchanan, and groundwater flows from the southwest to the northeast into San Juan Bay (Anderson 1976). CPC documents provided the most relevant information about groundwater quality in this area. However, this information is limited because these documents discuss only the equalization basin that is located on the northwest corner of the CPC property.

Mr. Jose Rodriguez, a hydrologist with the Water Resources section of the USGS, was interviewed by Woodward-Clyde. Mr. Rodriguez stated that the USGS had no knowledge of groundwater contamination flowing onto Fort Buchanan from the adjacent properties. However, there are no monitoring wells located along the Caribbean Gulf Refinery's boundary with Fort Buchanan from which to evaluate the potential migration of contaminants onto Fort Buchanan.

A map of wells, either destroyed or abandoned on or near Fort Buchanan, was provided; however, there was no information about water quality associated with these wells. There are three active wells on Fort Buchanan associated with the USTs removed from near Building 615.

Results of field investigations conducted by Anderson-Mulholland & Associates, Inc. in the summer of 1991 indicate that the uppermost aquifer in the local vicinity of the CPC equalization basin is confined to semi-confined. The equalization basin is located on the northwest corner of the CPC property (i.e., west of Fort Buchanan). This observation was confirmed in 1993 during installation of two groundwater monitoring wells for assessment monitoring, but the uppermost aquifer is composed of clay with varying amounts of silt and sand (Anderson-Mulholland and Associates, Inc. 1994a). According to the 1994 RCRA Post-Closure Permit Application, drilling evidence from other areas of the facility suggests that the uppermost aquifer is unconfined.

CPC conducts groundwater monitoring at their equalization basin in accordance with 40 CFR 265.91 to 265.94 and submits the results annually. According to the CPC 1993 *Annual Groundwater Monitoring Report* (the last one available), the groundwater elevation in the area of the equalization basin ranges from four to eight feet above MSL, and the groundwater flow is generally to the north, with a localized western component that also eventually flows northward. The groundwater flow velocity in the uppermost aquifer in the vicinity of the CPC equalization basin is estimated to range from 3.3 to 7.8 feet per year.

In 1993, benzene, xylene, barium, antimony, methyl tertiary-butyl ether (MTBE), and tertiary-butyl-alcohol (TBA) were detected in the groundwater in wells near the equalization basin. The upgradient well, located on the south side of the equalization basin, contained no constituents of concern indicating that contamination was not migrating from upgradient sources. In 1994, benzene was detected in the upgradient well. The benzene was interpreted to be from an external source west of the equalization basin, rather than the equalization basin. This interpretation was based on groundwater flow information and the absence of benzene contamination at adjacent monitoring wells. The source of the benzene contamination has not been determined (Anderson-Mulholland and Associates, Inc. 1994b).

4.3.1 Off-Site Potential Sources of Contamination

A search of federal computerized databases consisted of listing all the sites within the zip code for Fort Buchanan and the three zip codes of the areas that surround the base. Maps identifying adjacent or surrounding properties were not available. Computerized searches were also not available for commonwealth records. The Woodward-Clyde field team conducted an automobile survey of adjacent properties and recorded the names of industries adjacent to Fort Buchanan. EQB provided a list of generators of hazardous waste for the island of Puerto Rico. Figure 4-1 and the tables within the section were compiled using the list of hazardous waste generators, the zip code searches of federal records, a local phone book, and a local area map.

Several of the off-site properties were observed from vehicles during drive-by inspections. Since there are numerous adjacent properties, they have been categorized by areas and are discussed in the following sections.

4.3.1.1 Luchetti Industrial Park

Luchetti Industrial Park is located west of Fort Buchanan. CPC is part of Luchetti Industrial Park. Since Luchetti Industrial Park is mostly located hydraulically crossgradient to Fort Buchanan, groundwater contamination is unlikely. Table 4-1 lists potential sources of contamination for Fort Buchanan from properties located in Luchetti Industrial Park.

Table 4-1
LUCHETTI INDUSTRIAL PARK PROPERTIES

CORPORATION	FINDS/LISTING
Reliance Universal of Puerto Rico	Large Quantity Generator
Island Litho Corporation	Large Quantity Generator
Gulf Service Station	Probable USTs
Caribe Metallurgical	Facility Index System

CORPORATION	FINDS/LISTING
American Chemical Corp. Prod. Del.	Facility Index System
H.B. Fuller Company	Large Quantity Generator
Danosa Caribbean Inc.	Large Quantity Generator
Betteroads Asphalt Corp.	Facility Index System
UCAR Resinas Caribe, Inc.	Small Quantity Generator
Bayamón Steel Processors	Large Quantity Generator
Petroleum Chemical Corporation	Large Quantity Generator
Caribbean Gulf Ref. Co.	Small Quantity Generator
Caribbean Petroleum Corp.	Large Quantity Generator
Abandoned Shell Service Station	Probable USTs

The FINDS is a compilation of any property or site that EPA has investigated, reviewed, or been made aware of in connection with its various regulatory programs.

Small quantity generators produce 100 kg per month but less than 1,000 kg per month of non-acutely hazardous waste.

Large quantity generators produce at least 1,000 kg per month of non-acutely hazardous waste (or 1 kg per month of acutely hazardous waste).

4.3.1.2 Caribbean Petroleum Corporation

As stated in the 1994 CPC RCRA Post-Closure Permit Application, CPC operates a 43,000-barrel per day petroleum refining facility in Bayamón. Refinery operations have continued at the site since 1955. The CPC site encompasses approximately 179 acres, of which 115 are developed. The facility is divided into process, tank farm, wastewater treatment, and administration areas.

Crude oil is pumped from an ocean terminal via an aboveground pipeline system approximately 2.5 miles to the CPC site, where it is stored in ASTs prior to processing. This pipeline is north of Fort Buchanan and is shown in Figure 4-1. In addition, CPC products are pumped from the refinery to the terminal for transportation off the island. CPC's tank farm includes approximately 40 aboveground steel tanks ranging in capacity from 500 to over 200,000 barrels. According to CPC, all tanks are properly bermed in accordance with appropriate spill prevention control requirements. The tank farm also includes a propane storage area.

Major products include unleaded gasoline, fuel oil, fuel gases, kerosene, diesel fuel, residual fuels, petroleum distillates, and asphalt. There is no manufacturing of secondary petrochemicals at the site. There are also maintenance shops and laboratory facilities at CPC. The surface waters at the CPC facility consist of surface impoundments, streams (quebradas), and drainage ditches. The major drainage direction of the CPC facility is to the north.

Benzene was detected at a maximum concentration of 226 ppb in a groundwater sample collected on April 27, 1995 from a monitoring well located south of Building 618 in the 600 Area of Fort Buchanan. Installation personnel could not identify the source of contamination and expressed concern that the Caribbean Gulf Refinery's Tank Farm, located southwest of the 600 Area, may be a potential source. The general groundwater flow direction is to the northeast; however, complicated flow paths may be present because of the karst environment present in this area. Currently, there are no monitoring wells located along the Caribbean Gulf Refinery's boundary with Fort Buchanan from which to monitor the potential migration of contaminants.

As part of its wastewater treatment facility, CPC operated an equalization basin to receive effluent from oil/water separation units and discharged it to a biological treatment system. The equalization basin is an unlined surface impoundment that is regulated under Subtitle C of RCRA because it managed D018 and F038 wastes. The equalization basin ceased receipt of hazardous waste on June 6, 1993. In April 1994, sludge was removed from the unit. Currently, the unit is out of service and will undergo closure upon EPA approval of the Closure Plan.

In addition to the equalization basin, CPC has identified 27 potential SWMUs at the facility. CPC operates under an EQB Air Permit and Prevention of Significant Deterioration (PSD) Permit from EPA. They also comply with New Source Performance Standards (NSPS) regulations and National Ambient Air Quality Standards (NAAQS). Over the years there has been concern about air emissions from CPC affecting residents of Fort Buchanan. According to EQB, test results taken from the air monitoring station located on Fort Buchanan are within EPA's acceptable levels for all contaminants including particulates. The prevailing winds in the Guaynabo air basin are from east to west, indicating that the air emissions from the refinery generally move away from Fort Buchanan.

4.3.1.3 West Gate Industrial Park

West Gate Industrial Park, located northeast of Fort Buchanan, is hydraulically downgradient and has probably not impacted the installation. Table 4-2 lists potential sources of contamination for Fort Buchanan located in or near West Gate Park. Specific information about USAR AMSA, which is near the industrial park, is discussed in Section 4.3.1.4.

Table 4-2
POTENTIAL SOURCES OF CONTAMINATION IN OR NEAR WEST GATE PARK

CORPORATION	FINDING/LISTING
Carrier Puerto Rico, Inc.	Conditionally Exempt Small Quantity Generator
Bristol Meyers Squibb PR Inc.	Conditionally Exempt Small Quantity Generator
USGS WRD	Conditionally Exempt Small Quantity Generator

Table 4-2
(Continued)

CORPORATION	FINDING/LISTING
Metropolitan Detention Center	Small Quantity Generator
B & B Wood Treating and Processing	Conditionally Exempt Small Quantity Generator
Molinos De Puerto Rico Inc.	Large Quantity Generator
Esso Cataño Terminal	Small Quantity Generator
Texaco PR Inc., Cataño Terminal	Small Quantity Generator
Cataño Pump Station	Small Quantity Generator
Cataño Installation	Small Quantity Generator
USAR AMSA	Two 5,000-gallon USTs, one 600-gallon AST

Conditionally exempt small quantity generators produce less than 100 kg per month of non-acutely hazardous waste.

4.3.1.4 Amelia Industrial Park and Metro Office Park

Amelia Industrial Park and Metro Office Park are located east of Fort Buchanan. Amelia Industrial Park is surrounded by Fort Buchanan on three sides. It is located hydraulically upgradient of the 600 Area of Fort Buchanan and could potentially impact the installation. Metro Office Park is located hydraulically crossgradient of Fort Buchanan and probably will not impact the installation. Air emissions from the industry in this area may potentially affect BRAC parcels subject to transfer or lease. The prevailing wind direction during the day is from the northeast and from the southeast at night. Information was not available identifying past environmental concerns of air emissions from the industry in this area. During visual inspections of this adjacent property, the only identified prominent stack emission source was an abandoned glass manufacturing plant located adjacent to and east of the 600 Area. Information on this glass manufacturing plant was not available. Table 4-3 lists potential sources of contamination for Fort Buchanan located in or near these two parks.

Table 4-3
POTENTIAL SOURCES OF CONTAMINATION IN AMELIA INDUSTRIAL PARK AND METRO OFFICE PARK

CORPORATION	FINDING/LISTING
Wyeth Ayerst Laboratories Puerto Rico	Conditionally Exempt Small Quantity Generator
RJ Reynolds Tobacco Co.	Conditionally Exempt Small Quantity Generator
El Dia, Inc. (newspaper)	Small Quantity Generator
Federal Express Corporation	Conditionally Exempt Small Quantity Generator
Baxter Sales and Distribution Corporation	Small Quantity Generator
Texaco Service Station	Probable USTs
Gulf Service Station	Probable USTs
Cosmetics & Chemicals Manufacturing, Inc.	Facility Index System

Since 1985, DPW has reported to EPA and EQB that oil and solvents have been discharged into a storm drain in Amelia Industrial Park that drains through Fort Buchanan. The effluent flows in an unlined storm drainage ditch north across the 600 Area of Fort Buchanan, under the road PR-28, continuing through some wetlands, and finally into San Juan Bay.

On November 9, 1995, an investigation was performed by the Department of Water Quality at EQB to determine the source of contamination in the 600 Area ditch. It was determined that used oil and water were being dumped down a manhole on street "A" in the Amelia Industrial Park. Smoke and dye tests were used to determine that the sanitary lines were working correctly. Used oil was observed at a grate that discharged to the storm drainage ditch at Fort Buchanan. Pan American Grain Manufacturing Company, Inc. was inspected and it was determined that the discharges came from this industry. In the area of the facility, two diesel ASTs and a tank where used oil is stored were observed. The used oil tank did not have secondary containment. EQB has notified the president of Pan American Grain Manufacturing Company of the deficiencies and requested the implementation of corrective action measures.

During site investigations in December 1995, several 55-gallon drums were observed behind (west) DIMA International Corporation, located on the southwest end of Amelia Industrial Park. The following notations were observed on some of the drums: Monoethylene glycol, CAS No. 107-21-1, Pralca. Several dozen drums were stored in the area with no secondary containment observed.

A large AST was also observed during site investigations in December 1995. The AST is located on the property of an abandoned glass factory on the northeast portion of Amelia Industrial Park. The contents of the tank are unknown.

4.3.1.5 Residential Area South of Fort Buchanan

Table 4-4 lists the potential sources of contamination for Fort Buchanan from properties located south of Fort Buchanan. All of the following industries are located hydraulically upgradient of Fort Buchanan and could potentially impact the installation.

Table 4-4
POTENTIAL SOURCES OF CONTAMINATION FROM PROPERTIES LOCATED SOUTH OF FORT BUCHANAN

CORPORATION	FINDING/LISTING
Esso Standard Oil	Small Quantity Generator
Hi Tech Auto Care Center	Small Quantity Generator
Marina Commercial Plaza	Small Quantity Generator
Estee Lauder Caribbean, Inc.	Large Quantity Generator

Many of the houses located south of Fort Buchanan do not have sanitary sewer facilities. Many of the residents dispose of used water in septic tanks, and gray water is discharged into streams or to the ground. On October 31, 1995, the Department of Water Quality at EQB determined, using dyes, that the stormwater system is connected to the sanitary sewer system in the residential housing area of Tintillo Gardens. Both of these systems are overflowing into El Toro Creek, which crosses Fort Buchanan.

An inspection conducted in February 1996 by EQB Water Quality Division personnel identified that the concrete sewer pipeline was broken at the point of entrance to Fort Buchanan. The concrete pipe runs parallel to El Toro Creek, and sewage water was observed discharging into the creek. A seven-week stream water sampling program was implemented from March 14, 1996 through May 2, 1996. Samples were collected on a weekly basis from three sampling locations (Figure 5-1). Table 4-5 compares the maximum concentrations of the water quality parameters analyzed for in the samples collected and the EQB water quality standards.

Table 4-5
WATER QUALITY RESULTS
STREAM WATER SAMPLES
EL TORO CREEK

PARAMETER	MAXIMUM CONCENTRATION[a] (MG/L)	EQB STANDARD[b] (MG/L)	SAMPLING LOCATION NUMBER	SAMPLING DATE
Ammonia	6.80	1	1	March 21, 1996
Biochemical Oxygen Demand	19.0	Not Applicable	2	May 2, 1996
Chemical Oxygen Demand	47.0	Not Applicable	1	March 21, 1996
Dissolved Oxygen (minimum)	4.8	5.0	1	March 14, 1996
Nitrite-N	1.43	Nitrate plus Nitrite 10	1	March 28, 1996
Nitrate-N	0.49	Nitrate plus Nitrite 10	2	March 28, 1996
Total Kjeldahl Nitrogen	8.58	Not Applicable	2	April 2, 1996
pH range (standard pH units)	6.9 8.73	6.0 9.0	1 2	March 21, 1996 March 14, 1996
Fecal Coliform (colonies/100ML)	16K	2K	All sampling locations	Every sample analyzed
Total Coliform (colonies/100ML)	16K	10K	All sampling locations	Every sample analyzed

Notes:

[a] Source: Toro Creek Surface/Stream/Water Grab Sample Results, Fort Buchanan, Order #96-05-072, Environmental Quality Laboratories, Inc., 1996

[b] Source: Puerto Rico Water Quality Standards Regulations, as Amended (for Class SD Waters), Commonwealth of Puerto Rico, Office of the Governor, Environmental Quality Board, 1990

As illustrated in Table 4-5, several of the water quality parameters analyzed for exceeded the EQB standard. As a result, PRASA has initiated a repair and replacement program for the sewer pipeline (Section 4.5.2).

4.4 NON-CERCLA RELATED ENVIRONMENTAL, HAZARD, AND SAFETY ISSUES

The following summarizes the results of the records review pertaining to non-CERCLA contamination substances as well as any documented hazard or safety issues.

4.4.1 Asbestos-Containing Material

Fort Buchanan has an asbestos management program that includes surveys for ACM in buildings and removal actions, as appropriate. At the time of the EBS site visit, the asbestos abatement program for the family housing areas was in its second year of a three-year program. Approximately 90 percent of the family housing units have had ACM removed. Results from the asbestos abatement program for the family housing areas are provided in Table 5-1b.

Designation of buildings at Fort Buchanan were based on reported identification and/or removal of ACM. If ACM was present but not fully remediated, the building was designated “A.” If ACM was never present or was identified and fully remediated, the building was considered to be asbestos free and no designation was given. When ACM was suspect (based on a construction date before 1985), and no remediation had been performed, the building was designated “A(P)” for possible presence of ACM in the building.

4.4.2 Lead-Based Paint

Fort Buchanan has conducted limited interior and exterior LBP surveys for the family housing areas of the installation. These surveys were performed by a certified surveyor using a SCITEC MAP 3, X-ray fluorescence (XRF) spectrometer instrument. Not all homes have been surveyed; however, all the homes have been well maintained, and the quality of the painted surfaces is good. Survey results from each family housing area are described in this section and are listed in Table 5-1b. Housing units receiving positive analytical results were qualified with an “L.” In addition, all buildings not sampled and constructed prior to 1978 were qualified with an “L(P)” due to the possible presence of LBP in the building. Additionally, soils surrounding buildings that have had LBP removed from their exterior with no documented capture may contain LBP.

An LBP survey was conducted on the interiors of 21 housing units within the Coconut Grove Family Housing Area. Results of the LBP survey indicated that positive readings were found on wooden components (e.g., shelves, shelf supports, and door casings) and concrete walls and/or ceilings of approximately 30 percent of the units surveyed (USAEHA 1992).

An LBP survey was conducted on the exteriors of six housing units within the Coconut Grove Family Housing Area. Only one sample from the metal louver on Building 1129 had a positive reading for LBP (USAEHA 1992).

An LBP survey was conducted on the interiors of 16 housing units within the Buchanan Heights Family Housing Area. Results of the LBP survey indicated that positive readings were found on wooden shelves in approximately 90 percent of those units surveyed. The remaining wood components (e.g., doors, door jambs, door headers, and shelf supports) exhibited no discernible pattern throughout the units tested (USACE 1993a).

An LBP survey was conducted on the exteriors of 13 housing units within the Buchanan Heights Family Housing Area. No positive XRF readings for LBP were observed (USACE 1993a).

An LBP survey was conducted on the interiors of five housing units within the Las Colinas Family Housing Area. Results of the LBP survey indicated that positive readings were found on wooden doors in approximately 80 percent of those units surveyed. Inconsistent XRF readings on the walls and ceilings suggest that each unit be treated separately. Occupant-applied or irregular paint may account for the inconsistencies (USACE 1993b).

An LBP survey was conducted on the exteriors of six housing units within the Las Colinas Family Housing Area. All housing units tested contained LBP within the primer beneath the grey paint on the metal stairway railing (USACE 1993b).

An LBP survey was conducted on the interiors of thirteen housing units within the Coqui Gardens Family Housing Area. Results of the LBP survey indicated that positive readings were found on wooden components (e.g., shelves, shelf supports, and door casings) of approximately 25 percent of the units surveyed (USAEHA 1992).

An LBP survey was conducted on the exteriors of ten housing units within the Coqui Gardens Family Housing Area. No LBP was recorded for these housing units (USAEHA 1992).

These reports indicate that LBP had largely been removed from the exterior of housing units by a contractor. No documentation was available confirming that LBP was captured following removal. Soils surrounding housing units are, therefore, suspected of containing LBP.

Storage of rusted and unlabeled one-gallon paint cans occurs at various locations throughout the base. During visual inspections, base personnel indicated that the paint cans in question have been stored at these locations for an undetermined amount of time and have no planned use. Based on the period of storage and the poor condition of the paint cans, paint within these one-gallon cans is suspected to be lead-based. These locations include Buildings S-20, S-389, and S-18. No evidence of release at Buildings 20 and 389 was observed during the EBS site visit.

The fenced area located south of Building S-18 was investigated in June 1994 by the USACE, Jacksonville District (USACE 1994b) because several empty paint cans were observed laying on their sides or upside down. A soil sample was collected and analyzed for arsenic, cadmium, lead, mercury, selenium, and barium; the reported values for these metals was above the EPA screening levels but was under the toxic characteristic leaching procedure (TCLP) regulatory limits (USACE 1994b). According to DPW employees, the paint cans were removed after the USACE 1994 inspection. During the 1995 site visit, several empty paint cans were present at Building S-18 but could not be closely examined due to the fence.

Areas where buildings constructed prior to 1975 have been burned down and sampling or remediation has not been undertaken are also suspected to contain residual LBP within the soils. Buildings 183 and 357 were identified during the EBS site visit as fitting this description. An LBP mitigation program is planned for fiscal year 1997 for buildings within the BRAC property. This program will include soils surrounding buildings, as well as the building interiors and exteriors (Perez 1996b).

4.4.3 Polychlorinated Biphenyls

Fort Buchanan has tested for PCB-containing oil in all of its transformers and has replaced 130 of them. PCB transformers were all off base as of September 1978. Before these transformers were disposed of, samples were drawn from the transformer oils and analyzed by the USAEHA in Aberdeen, Maryland. PCB-laden transformers were forwarded to Aberdeen for disposal (Cabrera 1991). A listing of PCB analysis results for transformers sampled identifies nine transformers with a value greater than 50 ppm and less than 500 ppm and four transformers with a value greater than 500 ppm (Perez 1981). The transformers were numbered; however, these numbers could not be linked to a specific location on the installation.

Building 746, located at the southwestern end of the Buchanan Heights Family Housing Area, is currently occupied by DOJ. During a visual survey of the Southwest Undeveloped Area, an old transformer was identified within a small fenced-in area adjacent to the south side of the building. The transformer's serial number is 697597. The transformer was on a concrete hardstand and no signs of leakage were observed. The escort present during the visual survey had no prior knowledge of the old transformer, and sampling records reviewed did not indicate that it was sampled for PCBs (Waldmann 1995h). Subsequent to the EBS investigation, the transformer oil was tested (on May 14, 1996) and was found not to contain PCBs (Perez 1996b).

4.4.4 Radon

Radon gas testing has occurred within 555 buildings on Fort Buchanan. No results were above the EPA action level of 4 pCi/L (Robles 1992).

4.4.5 Unexploded Ordnance

Unexploded ordnance were unearthed during utility construction near the Maxie Williams Jr. Ballfield in 1984 and 1985. Approximately five separate rounds, 6 inches in diameter and 18 to 24 inches long, were identified. These were suspected to be of World War II vintage. The Fort Buchanan Environmental Division notified the proper authorities, and explosive ordnance personnel removed the artillery shells (Gawarecki 1995e).

Additionally, as previously discussed in Section 4.2.8, a small arms firing range may have been located near the western portion of the present golf course driving range.

4.4.6 Radionuclides

Three areas were identified on Fort Buchanan as containing radiological sources.

The National Guard warehouse (Building 541), located north of the AMS, has a radiological materials storage room in the northeast portion of this facility. Radiological materials stored at this location consist of field equipment such as watches, compasses, and telescopes (Waldmann 1995f). The documentation reviewed did not identify any releases associated with this storage area. A Nuclear Regulatory Commission license is not required for the materials stored in Building 541.

X-ray equipment is located within the dental clinic (Building S-312) and the health clinic (Building S-518). The documentation reviewed did not identify any releases associated with these areas.

An archive search was initiated in October 1996 to identify other areas at Fort Buchanan that contain or may have contained radiological sources (Perez 1996b).

4.4.7 Pesticide and Herbicide Usage

The use and application of pesticides (insecticides and rodenticides) and herbicides at Fort Buchanan have been and are currently administered by the Building and Grounds Division of DPW. Pest control services encompass household, structural, health-related, and nuisance insect and rodent control programs, as well as weed control programs. Building S-551 currently stores pesticides and herbicides and application equipment used on post. This building was constructed in 1985. There has been no documented release of pesticides or herbicides associated with this building. This equipment and these types of materials were stored earlier in Building 138. Information to characterize the environmental condition of this site has not been collected.

Building 539 was used to store approximately 650 gallons of powdered DDT received from Fort Brooke in 1968. In 1977, the DDT and its breakdown products DDE and DDD were moved to Building 596. A closure plan was submitted to EQB, and closure certification for both buildings was approved on December 24, 1992 (de Valle 1992).
A common method used to apply herbicides on vegetation was to mix used oil with herbicides. This application method had been utilized on the golf course and along the perimeter road up until 15 years ago. Records indicate that chlordane was more commonly used on post prior to the early 1980s (Gawarecki 1995j).

A pesticide and herbicide mixing area located on a 5-foot by 5-foot unbermed concrete slab north of Building 138 was used from 1975 to approximately 1985. An interview revealed that when pesticides were mixed at this location, spills resulted in runoff into the open-banked stormwater drainage approximately twenty feet north of this site. In October 1991, EQB (Cabrera 1991) recommended that soil samples be collected from the area around the concrete slab and near the creek (drainage ditch). The report concluded that the potential for a release to soil, groundwater, and surface water was high due to the lack of a containment system. To date, samples have not been collected in this area.

4.5 REMEDIATION EFFORTS

Past, ongoing, or planned remediation efforts on Fort Buchanan are not expected to directly affect BRAC identified parcels subject to transfer or lease.

4.5.1 Past Remediation Efforts

Past remediation efforts at Fort Buchanan involved the removal and remediation of two buildings (Buildings 539 and T-596) formerly used for pesticide and herbicide storage and an investigation on a rumored pesticide and chemical burial trench. Closure reports for these past remediation efforts have been submitted to EQB, and closure certification was approved on December 24, 1992 (de Valle 1992). These areas are located within the 500 Area.

4.5.2 Ongoing Remediation Efforts

Ten ongoing response or remediation efforts have been identified.

- On October 4, 1995, an herbicide (Hyvar XL) spill was reported near the main entrance to Fort Buchanan along the north gate. The contamination was removed in accordance with the MSDS and the site is awaiting topsoil replacement.
- Two 5,000-gallon USTs located south of Building 615 were removed in 1995. Elevated levels of TPH and BTEX were reported in the soils. The excavated soils were bioremediated and the site was backfilled with the remediated soil (ERA 1995b). A closure plan has been submitted to EQB and is awaiting approval.

- One 300-gallon diesel UST located immediately south of Building 20 was removed in 1995. Elevated levels of TPH were detected (5,570 mg/kg) from the bottom of the tank pit. The excavated soils were bioremediated and the site was backfilled (ERA 1995b). A closure plan has been submitted to EQB and is awaiting approval.

- One 10,000-gallon UST located east of Building 152 was removed in 1995. At the time of excavation, one of the six samples collected had 129 mg/kg of TPH, which exceeded the EQB action level of 100 mg/kg for TPH (ERA 1995b). A closure plan has been submitted to EQB.

- Two additional USTs (one 5,000-gallon tank and one 10,000-gallon tank) and piping were discovered at the Building 152 excavation site. Information is limited for this maintenance facility, and it is not known whether additional USTs are located nearby. The two identified USTs are scheduled to be removed in 1996, and an SI will be conducted to determine if additional tanks are present (USACE 1995).

- Three 25,000-gallon USTs were discovered by the National Guard during the grading of an area designated for a parking lot west of the newly constructed National Guard Warehouse (Building 541). These were removed and, in April 1992, a subcontractor collected soil samples from the bottom of the excavation pit. These samples were reported below EQB and EPA corrective action levels (McCarthy 1992). Information confirming closure at this site was not available.

- The excavated soils from the removal of the three 25,000-gallon USTs discussed above were originally placed west of the excavation site and were later relocated by a contractor, at an undetermined date, to the present location west of Building S-514. In October 1992, the excavated soil was resampled and one (TPH of 130 mg/kg) of four samples exceeded the EQB TPH criteria (Law Environmental 1992b). These soils are being allowed to volatile until TPH is within EQB levels.

- In July 1996, an investigation was initiated to determine the location and orientation of the UST adjacent to Building 746 in the Buchanan Heights Family Housing Area. The tank was found to have a capacity of 1,000 gallons and to contain diesel fuel. A visual inspection and pressure testing indicated that the integrity of the tank was good and leaking had not occurred. The tank is scheduled to be removed in mid-November 1996. Closure will depend on analytical results of confirmation samples collected from beneath the tank and regulatory approval (Mariani 1996c).

- In July 1996, an investigation was initiated to determine the location and orientation of two USTs located by Building 138. The tanks were found to have a capacity of 5,500 to 6,000 gallons and contain fuel oil. Soil staining was observed, indicating the tanks have leaked. The tanks are scheduled to be removed, and a closure plan is in progress (Mariani 1996c).

- An inspection of the PRASA sewer line running parallel to El Toro Creek within Fort Buchanan revealed sewage water discharging to the creek. Analytical results of stream water samples collected from the creek indicated high fecal coliform levels. In response, PRASA initiated a repair and replacement program for the sewer pipeline. In March 1996, 12 feet of line was replaced and a manhole installed at the point where sewage water discharged into El Toro Creek. In June 1996, the brush and undergrowth vegetation, as well as sediments, obstructions, and any other deposits covering the pipeline, were cut and removed, exposing the entire pipeline. Additional work anticipated within the program includes an inspection of the entire pipeline and each tee to identify leaks. Any defects will be repaired or replaced. Each segment of the line will be inspected with PRASA’s internal closed circuit television vehicle, if necessary, to locate any root intrusions, cracked or broken pipe, off-set joints, etc., which may not be discovered during the external inspection. The long-term plan is to replace and relocate this sewer line with approximately 3,000 feet of 18-inch and 2,800 feet of 30-inch PVC pipe. A preventive maintenance program will be established for this line to verify and clean the line unit until the long-term line replacement is completed (O’Neill 1996).

4.5.3 Planned Remediation Efforts

Sampling has indicated oil contamination in three areas, and remediation activities are planned at three sites. The sources of contamination include petroleum product from leaking USTs, leaking drums of used oil, and hazardous materials at the DPW complex (Building 556) and the former and current auto hobby shops (Buildings S-563 and S-569).

A 275-gallon diesel UST located north of Building 376 (on non-BRAC property) was used to service the former telecommunications facility located within this building. The installation date of the tank is unknown. This UST is no longer used and is scheduled for removal in 1996. An estimated 40 gallons of product remains in the tank. There has been no documented release of petroleum product associated with this UST (U.S. Army 1995c).

Two USTs, estimated volumes of 5,000 gallons and 10,000 gallons, and piping were discovered during removal activities of a 10,000-gallon UST near Building 152. The contents of these USTs are unknown. Due to the limited information available for the maintenance facility, it is not known whether additional USTs are located nearby. These USTs and associated piping are scheduled to be removed in 1996 along with an SI to determine if additional tanks are present (U.S. Army 1995b).

The Fort Buchanan Environmental Division was informed on May 19 and 24, 1995 that a leak had occurred at the 65th ARCOM refueling area. The soils beneath the refueling point had received enough fuel to stain an area of approximately six square feet of soil. The Fort Buchanan Environmental Division sampled the soil and had samples analyzed for BTEX and TPH. The BTEX values were reported below proposed RCRA corrective action levels; however, the TPH was reported as being up to 25,000 mg/kg which exceeds the EQB criteria of 100 mg/kg. No remediation of this site has occurred (Analytical Environmental Services, Inc. 1995). However, the 65th ARCOM has been directed to promptly address this issue.

Installation personnel from the DPW at Fort Buchanan have indicated that the old landfill will be investigated. A focused sampling and analysis project will be conducted to confirm the presence or absence of hazardous materials within the landfill and evaluate the potential for releases to groundwater.

Additionally, DPW personnel conducted a visual inspection of the rumored hazardous materials burial site (south of Building S-18 in the Intermediate School Area). An investigation is planned (Mariani 1996c).

4.6 RETAINED ARMY PROPERTY

The four family housing areas are the only parcels identified at the time of the EBS as BRAC property subject to transfer or lease. All remaining property will not be excessed. Retained U.S. Army property is identified by a cross-hatch on Figure 5-1 of this report.

5.0 ENVIRONMENTAL CONDITION OF THE PROPERTY

This section presents the parcelization of the BRAC property in accordance with the criteria described in the CERFA guidance and the DOD *BCP Guidebook* (DOD 1993). Though Fort Buchanan contains 746 acres, only the four housing areas (comprising approximately 80 acres) have been identified as BRAC property subject to transfer or lease. These parcels are discussed in this section.

5.1 PARCEL DESIGNATIONS

Based on a review of installation documents; federal, commonwealth, and local records; and a site visit including employee interviews and visual inspections of the property and facilities, Woodward-Clyde divided the Fort Buchanan installation into BRAC parcels that represent the environmental condition of the property area. The BRAC parcels and corresponding categorizations are identified in Table 5-1a (following Section Five) and on the CERFA map, Figure 5-1. Areas containing non-CERCLA contamination substances are identified and delineated separately as qualified parcels in Table 5-1b (following Section Five). Qualified parcels overlay all environmental condition of the property categories (Categories 1 through 7). Parcels are labeled as described in Section 1.3. A 25-acre grid coordinate system is overlaid on the CERFA map to facilitate the parcelization discussion by geographically locating the various parcels.

Parcel boundaries are drawn using the best available information on the extent of contamination and do not follow map grid lines. Small point sources of contamination or storage, such as USTs, were delineated by circular 0.25-acre parcels centered on the source, as stipulated in DOD guidance. For consistency and to facilitate the summation of acreages, parcel acreages were calculated to two decimal places using the digitized map (Figure 5-1) and AutoCad Release 12. This method is not meant to imply an accuracy to one one-hundredth of an acre.

5.1.1 Category 1 Parcels

Woodward-Clyde's survey and subsequent parcelization of Fort Buchanan identified four parcels, approximately 77.79 acres, as Category 1 parcels. This section describes the Category 1 parcels and their locations on Figure 5-1.

<u>BRAC Parcel Number and Label 1(1)</u>
CERFA Map Location 2,3

This parcel is associated with the Coconut Grove Family Housing Area, which contains 141 housing units. This parcel is designated as Category 1 because there has been no documented storage of hazardous substances or petroleum products; nor has there been release, disposal, or migration from an adjacent property of hazardous substances or petroleum products within the identified area.

<u>BRAC Parcel Number and Label 2(1)</u>
CERFA Map Location 3,3

This parcel is associated with the Buchanan Heights Family Housing Area, which contains 98 housing units. This parcel is designated as Category 1 because there has been no documented storage of hazardous substances or petroleum products; nor has there been release, disposal, or migration from an adjacent property of hazardous substances or petroleum products within the identified area.

<u>BRAC Parcel Number and Label 3(1)</u>
CERFA Map Location 4,2

This parcel is associated with the Las Colinas Family Housing Area, which contains 32 housing units. This parcel is designated as Category 1 because there has been no documented storage of hazardous substances or petroleum products; nor has there been release, disposal, or migration from an adjacent property of hazardous substances or petroleum products within the identified area.

<u>BRAC Parcel Number and Label 4(1)</u>
CERFA Map Location 7,2

This parcel is associated with the Coqui Gardens Family Housing Area, which contains 48 housing units. This parcel is designated as Category 1 because there has been no documented storage of hazardous substances or petroleum products; nor has there been release, disposal, or migration from an adjacent property of hazardous substances or petroleum products within the identified area.

5.1.2 Category 2 Parcels

No Category 2 parcels were identified within the BRAC property.

5.1.3 Category 3 Parcels

No Category 3 parcels were identified within the BRAC property.

5.1.4 Category 4 Parcels

No Category 4 parcels were identified within the BRAC property.

5.1.5 Category 5 Parcels

No Category 5 parcels were identified within the BRAC property.

5.1.6 Category 6 Parcels

No Category 6 parcels were identified within the BRAC property.

5.1.7 Category 7 Parcels

One Category 7 parcel totaling approximately 0.90 acres was identified within the BRAC property scheduled for realignment. This parcel is identified on Figure 5-1 and summarized on Table 5-1a. The Category 7 parcel is an area that requires additional evaluation.

BRAC Parcel Number and Label 5(7)
CERFA Map Location 1,3

This parcel is associated with the installation’s perimeter road located west of the Coconut Grove Family Housing Area. Interviews with base personnel revealed that a common method of applying herbicides to vegetation was to mix used oil and diesel fuel with herbicides. This application method had been utilized on the golf course and along the perimeter road up until 15 years ago (Gawarecki 1995j). No information is available characterizing the environmental condition of soils near the perimeter road located on the west side of the Coconut Grove Family Housing Area. The parcel has been designated as Category 7 because additional evaluation may be warranted.

5.1.8 Qualified Parcels

In determining the qualified parcels, Woodward-Clyde observed the following guidelines:

- If a complete asbestos survey has not been conducted, then buildings constructed prior to 1985 were assumed to contain ACM. An "A(P)" for the possible presence of asbestos was used to qualify the parcel.

- If a complete LBP survey has not been conducted, then buildings constructed prior to 1978 were assumed to contain LBP. Additionally, soils surrounding buildings which have had LBP removed from their exterior with no documented capture may contain LBP. An "L(P)" for the possible presence of LBP was used to qualify the parcel.

There are 195 parcels, approximately 9.27 acres, that are designated as qualified parcels. These qualified parcels correspond with buildings/facilities within the BRAC property. The acreage presented corresponds to the sum of the "footprints" of the buildings/facilities. Qualified parcels are described in Table 5-1b.

Table 5-1a
BRAC PARCEL DESCRIPTIONS
FORT BUCHANAN, PUERTO RICO

BRAC PARCEL NUMBER AND LABEL[a]	LOCATION (X,Y COORDINATES)	APPROXIMATE SIZE (ACRES)[b]	GEOGRAPHIC AREA	ENVIRONMENTAL CONDITION CATEGORY NUMBER	BASIS	EBS SOURCE OF EVIDENCE[c]	REMEDIATION/ MITIGATION
1(1)	2,3	32.10	Coconut Grove Housing Area	1	There has been no documented storage of hazardous substances or petroleum products; nor has there been release, disposal, or migration from an adjacent property of hazardous substances or petroleum products within the identified area.	33, 32	None required.
2(1)	3,3	14.69	Buchanan Heights Housing Area	1	There has been no documented storage of hazardous substances or petroleum products; nor has there been release, disposal, or migration from an adjacent property of hazardous substances or petroleum products within the identified area.	33, 32	None required.
3(1)	4,2	15.00	Las Colinas Housing Area	1	There has been no documented storage of hazardous substances or petroleum products; nor has there been release, disposal, or migration from an adjacent property of hazardous substances or petroleum products within the identified area.	33, 32	None required.
4(1)	7,2	16.00	Coqui Gardens Housing Area	1	There has been no documented storage of hazardous substances or petroleum products; nor has there been release, disposal, or migration from an adjacent property of hazardous substances or petroleum products within the identified area.	33, 32	None required.

Table 5-1a
(Continued)

BRAC PARCEL NUMBER AND LABEL[a]	LOCATION (X,Y COORDINATES)	APPROXIMATE SIZE (ACRES)[b]	GEOGRAPHIC AREA	ENVIRONMENTAL CONDITION CATEGORY NUMBER	BASIS	EBS SOURCE OF EVIDENCE[c]	REMEDIATION/ MITIGATION
5(7)	1,3	0.90	Coconut Grove Housing Area	7	Used oil and diesel fuel were mixed with herbicides and applied along the perimeter road.	36	No studies have been conducted to identify the presence of contaminants, if any.

Notes:

[a] BRAC parcel label definitions are as follows:

PS = petroleum storage
PR = petroleum release or disposal
HS = hazardous substance storage
HR = hazardous substance release or disposal

Qualified parcel label definitions are as follows:

A = asbestos-containing material
L = lead-based paint
P = polychlorinated biphenyls
R = radon
X = UXO and/or ordnance fragments
RD = radionuclides
(P) = possible (unverified)

[b] Acreage figures are approximate; they have been calculated using AutoCad Release 12.

[c] EBS Source of Evidence numbers refer to documents listed in Table 2-1 of this report.

Table 5-1b
QUALIFIED PARCEL DESCRIPTIONS
FORT BUCHANAN, PUERTO RICO

QUALIFIED PARCEL NUMBER AND LABEL[a]	LOCATION (X,Y COORDINATES)	APPROXIMATE SIZE (ACRES)[b]	GEOGRAPHIC AREA	BASIS	EBS SOURCE OF EVIDENCE[c]	REMEDIATION/ MITIGATION
1-1101Q-A/L(P)	3,3	0.03	Coconut Grove Housing Area	ACM confirmed by previous sampling and testing. LBP possible based on the age of the building. LBP may be present within perimeter soils of the building.	56, 55, 54	Asbestos abatement program is ongoing. LBP mitigation program planned for fiscal year (FY) 1997.
1-1102 to 1104Q-L(P)	3,3	0.08	Coconut Grove Housing Area	LBP possible based on the age of the buildings. LBP may be present within perimeter soils of the buildings.	54	LBP mitigation program planned for FY 1997.
1-1106 to 1107Q-L(P)	3,3	0.05	Coconut Grove Housing Area	LBP possible based on the age of the buildings. LBP may be present within perimeter soils of the buildings.	54	LBP mitigation program planned for FY 1997.
1-1109 to 1110Q-L(P)	3,3	0.06	Coconut Grove Housing Area	LBP possible based on the age of the buildings. LBP may be present within perimeter soils of the buildings.	54	LBP mitigation program planned for FY 1997.
1-1112 to 1113Q-L(P)	3,3	0.06	Coconut Grove Housing Area	LBP possible based on the age of the buildings. LBP may be present within perimeter soils of the buildings.	54	LBP mitigation program planned for FY 1997.
1-1115 to 1116Q-L(P)	2,3	0.06	Coconut Grove Housing Area	LBP possible based on the age of the buildings. LBP may be present within perimeter soils of the buildings.	54	LBP mitigation program planned for FY 1997.
1-1118Q-L(P)	2,3	0.03	Coconut Grove Housing Area	LBP possible based on the age of the buildings. LBP may be present within perimeter soils of the buildings.	54	LBP mitigation program planned for FY 1997.
1-1119Q-A/L(P)	2,3	0.03	Coconut Grove Housing Area	ACM confirmed by previous sampling and testing. LBP possible based on the age of the building. LBP may be present within perimeter soils of the building.	55, 54	Asbestos abatement program is ongoing. LBP mitigation program planned for FY 1997.
1-1120Q-L(P)	2,3	0.02	Coconut Grove Housing Area	LBP possible based on the age of the buildings. LBP may be present within perimeter soils of the buildings.	54	LBP mitigation program planned for FY 1997.
1-1123 to 1124Q-L	2,3	0.06	Coconut Grove Housing Area	LBP confirmed by previous sampling and testing. Additionally, LBP may be present within perimeter soils of the buildings.	27	LBP mitigation program planned for FY 1997.
1-1125 to 1128Q-L(P)	2,3	0.12	Coconut Grove Housing Area	LBP possible based on the age of the buildings. LBP may be present within perimeter soils of the buildings.	54	LBP mitigation program planned for FY 1997.
1-1129Q-L	2,3	0.03	Coconut Grove Housing Area	LBP confirmed by previous sampling and testing. Additionally, LBP may be present within perimeter soils of the building.	27	LBP mitigation program planned for FY 1997.

Table 5-1b
(Continued)

QUALIFIED PARCEL NUMBER AND LABEL[a]	LOCATION (X,Y COORDINATES)	APPROXIMATE SIZE (ACRES)[b]	GEOGRAPHIC AREA	BASIS	EBS SOURCE OF EVIDENCE[c]	REMEDIATION/ MITIGATION
1-1130Q-A/L(P)	2,3	0.02	Coconut Grove Housing Area	ACM confirmed by previous sampling and testing. LBP possible based on the age of the buildings. LBP may be present within perimeter soils of the buildings.	56, 55, 54	Asbestos abatement program is ongoing. LBP mitigation program planned for FY 1997.
1-1131Q-L(P)	2,3	0.03	Coconut Grove Housing Area	LBP possible based on the age of the buildings. LBP may be present within perimeter soils of the buildings.	54	LBP mitigation program planned for FY 1997.
1-1133Q-A/L(P)	1,3	0.03	Coconut Grove Housing Area	ACM confirmed by previous sampling and testing. LBP may be present within perimeter soils of the building.	57, 55	Asbestos abatement program is ongoing. LBP mitigation program planned for FY 1997.
1-1136 to 1137Q-L(P)	1,3	0.06	Coconut Grove Housing Area	LBP possible based on the age of the buildings. LBP may be present within perimeter soils of the buildings.	54	LBP mitigation program planned for FY 1997.
1-1138Q-L	1,3	0.03	Coconut Grove Housing Area	LBP confirmed by previous sampling and testing. Additionally, LBP may be present within perimeter soils of the building.	27	LBP mitigation program planned for FY 1997.
1-1139Q-L(P)	1,3	0.03	Coconut Grove Housing Area	LBP possible based on the age of the buildings. LBP may be present within perimeter soils of the buildings.	54	LBP mitigation program planned for FY 1997.
1-1141Q-L(P)	1,3	0.03	Coconut Grove Housing Area	LBP possible based on the age of the buildings. LBP may be present within perimeter soils of the buildings.	54	LBP mitigation program planned for FY 1997.
1-1142Q-A/L(P)	1,3	0.03	Coconut Grove Housing Area	ACM confirmed by previous sampling and testing. LBP possible based on the age of the building. LBP may be present within perimeter soils of the building.	57, 55, 54	Asbestos abatement program is ongoing. LBP mitigation program planned for FY 1997.
1-1143Q-A/L	1,3	0.03	Coconut Grove Housing Area	ACM confirmed by previous sampling and testing. LBP confirmed by previous sampling and testing. Additionally, LBP may be present within perimeter soils of the building.	57, 55, 27	Asbestos abatement program is ongoing. LBP mitigation program planned for FY 1997.
1-1144 to 1147Q-L(P)	1,3	0.12	Coconut Grove Housing Area	LBP possible based on the age of the buildings. LBP may be present within perimeter soils of the buildings.	54	LBP mitigation program planned for FY 1997.
1-1148Q-A/L(P)	1,3	0.02	Coconut Grove Housing Area	ACM confirmed by previous sampling and testing. LBP possible based on the age of the building. LBP may be present within perimeter soils of the building.	57, 55, 54	Asbestos abatement program is ongoing. LBP mitigation program planned for FY 1997.
1-1149Q-L(P)	1,3	0.03	Coconut Grove Housing Area	LBP possible based on the age of the buildings. LBP may be present within perimeter soils of the buildings.	54	LBP mitigation program planned for FY 1997.
1-1150Q-A/L(P)	1,3	0.03	Coconut Grove Housing Area	ACM confirmed by previous sampling and testing. LBP may be present within perimeter soils of the building.	57, 55	Asbestos abatement program is ongoing. LBP mitigation program planned for FY 1997.
1-1151 to 1159Q-L(P)	1,3	0.27	Coconut Grove	LBP possible based on the age of the buildings.	54	LBP mitigation program

Table 5-1b
(Continued)

QUALIFIED PARCEL NUMBER AND LABEL[a]	LOCATION (X,Y COORDINATES)	APPROXIMATE SIZE (ACRES)[b]	GEOGRAPHIC AREA	BASIS	EBS SOURCE OF EVIDENCE[c]	REMEDIATION/ MITIGATION
			Housing Area	LBP may be present within perimeter soils of the buildings.		planned for FY 1997.
1-1161Q-L(P)	2,3	0.03	Coconut Grove Housing Area	LBP possible based on the age of the buildings. LBP may be present within perimeter soils of the buildings.	54	LBP mitigation program planned for FY 1997.
1-1162 to 1163Q-A/L(P)	2,3	0.06	Coconut Grove Housing Area	ACM confirmed by previous sampling and testing. LBP may be present within perimeter soils in the building.	55, 54	Asbestos abatement program is ongoing. LBP mitigation program planned for FY 1997.
1-1164Q-L(P)	2,3	0.03	Coconut Grove Housing Area	LBP possible based on the age of the buildings. LBP may be present within perimeter soils of the buildings.	54	LBP mitigation program planned for FY 1997.
1-1165Q-A/L(P)	2,3	0.03	Coconut Grove Housing Area	ACM confirmed by previous sampling and testing. LBP possible based on the age of the building. LBP may be present within perimeter soils of the building.	55, 54	Asbestos abatement program is ongoing. LBP mitigation program planned for FY 1997.
1-1166Q-L(P)	2,3	0.03	Coconut Grove Housing Area	LBP possible based on the age of the buildings. LBP may be present within perimeter soils of the buildings.	54	LBP mitigation program planned for FY 1997.
1-1168Q-A/L(P)	2,3	0.03	Coconut Grove Housing Area	ACM confirmed by previous sampling and testing. LBP possible based on the age of the building. LBP may be present within perimeter soils of the building.	57, 55, 54	Asbestos abatement program is ongoing. LBP mitigation program planned for FY 1997.
1-1169Q-L(P)	2,3	0.02	Coconut Grove Housing Area	LBP possible based on the age of the buildings. LBP may be present within perimeter soils of the buildings.	54	LBP mitigation program planned for FY 1997.
1-1171 to 1174Q-L(P)	2,3	0.12	Coconut Grove Housing Area	LBP possible based on the age of the buildings. LBP may be present within perimeter soils of the buildings.	54	LBP mitigation program planned for FY 1997.
1-1176Q-L(P)	2,3	0.03	Coconut Grove Housing Area	LBP possible based on the age of the buildings. LBP may be present within perimeter soils of the buildings.	54	LBP mitigation program planned for FY 1997.
1-1178 to 1179Q-L(P)	2,3	0.06	Coconut Grove Housing Area	LBP possible based on the age of the buildings. LBP may be present within perimeter soils of the buildings.	54	LBP mitigation program planned for FY 1997.
1-1180Q-L	2,3	0.03	Coconut Grove Housing Area	LBP confirmed by previous sampling and testing. Additionally, LBP may be present within perimeter soils of the building.	27	LBP mitigation program planned for FY 1997.
1-1181 to 1184Q-L(P)	2,3	0.13	Coconut Grove Housing Area	LBP possible based on the age of the buildings. LBP may be present within perimeter soils of the buildings.	54	LBP mitigation program planned for FY 1997.
1-1186 to 1194Q-L(P)	2,3	0.26	Coconut Grove Housing Area	LBP possible based on the age of the buildings. LBP may be present within perimeter soils of the buildings.	54	LBP mitigation program planned for FY 1997.
1-1196 to 1202Q-L(P)	2,3	0.21	Coconut Grove	LBP possible based on the age of the buildings.	54	LBP mitigation program

Table 5-1b
(Continued)

QUALIFIED PARCEL NUMBER AND LABEL[a]	LOCATION (X,Y COORDINATES)	APPROXIMATE SIZE (ACRES)[b]	GEOGRAPHIC AREA	BASIS	EBS SOURCE OF EVIDENCE[c]	REMEDIATION/ MITIGATION
			Housing Area	LBP may be present within perimeter soils of the buildings.		planned for FY 1997.
1-1205 to 1206Q-L(P)	3,3	0.06	Coconut Grove Housing Area	LBP possible based on the age of the buildings. LBP may be present within perimeter soils of the buildings.	54	LBP mitigation program planned for FY 1997.
1-1208 to 1209Q-L(P)	3,3	0.06	Coconut Grove Housing Area	LBP possible based on the age of the buildings. LBP may be present within perimeter soils of the buildings.	54	LBP mitigation program planned for FY 1997.
1-1211Q-L(P)	3,3	0.03	Coconut Grove Housing Area	LBP possible based on the age of the buildings. LBP may be present within perimeter soils of the buildings.	54	LBP mitigation program planned for FY 1997.
1-1213 to 1214Q-L(P)	3,3	0.06	Coconut Grove Housing Area	LBP possible based on the age of the buildings. LBP may be present within perimeter soils of the buildings.	54	LBP mitigation program planned for FY 1997.
1-1215Q-L	3,3	0.03	Coconut Grove Housing Area	LBP confirmed by previous sampling and testing. Additionally, LBP may be present within perimeter soils of the building.	27	LBP mitigation program planned for FY 1997.
1-1216 to 1219Q-L(P)	2,3	0.12	Coconut Grove Housing Area	LBP possible based on the age of the buildings. LBP may be present within perimeter soils of the buildings.	54	LBP mitigation program planned for FY 1997.
1-1221 to 1229Q-L(P)	2,3	0.28	Coconut Grove Housing Area	LBP possible based on the age of the buildings. LBP may be present within perimeter soils of the buildings.	54	LBP mitigation program planned for FY 1997.
1-1231Q-L(P)	2,3	0.03	Coconut Grove Housing Area	LBP possible based on the age of the buildings. LBP may be present within perimeter soils of the buildings.	54	LBP mitigation program planned for FY 1997.
1-1232Q-A/L(P)	2,3	0.02	Coconut Grove Housing Area	ACM confirmed by previous sampling and testing. LBP possible based on the age of the buildings. LBP may be present within perimeter soils of the buildings.	56, 55, 54	Asbestos abatement program is ongoing. LBP mitigation program planned for FY 1997.
1-1233 to 1234Q-L(P)	2,3	0.06	Coconut Grove Housing Area	LBP possible based on the age of the buildings. LBP may be present within perimeter soils of the buildings.	54	LBP mitigation program planned for FY 1997.
1-1235 to 1237Q-L(P)	2,3	0.09	Coconut Grove Housing Area	LBP possible based on the age of the buildings. LBP may be present within perimeter soils of the buildings.	54	LBP mitigation program planned for FY 1997.
1-1238 to 1239Q-A/L(P)	1,3	0.06	Coconut Grove Housing Area	ACM confirmed by previous sampling and testing. LBP possible based on the age of the buildings. LBP may be present within perimeter soils of the buildings.	57, 55, 54	Asbestos abatement program is ongoing. LBP mitigation program planned for FY 1997.
1-1240Q-L(P)	1,3	0.03	Coconut Grove Housing Area	LBP possible based on the age of the buildings. LBP may be present within perimeter soils of the buildings.	54	LBP mitigation program planned for FY 1997.
1-1242Q-L(P)	3,3	0.02	Coconut Grove	LBP possible based on the age of the buildings.	54	LBP mitigation program

Table 5-1b
(Continued)

QUALIFIED PARCEL NUMBER AND LABEL[a]	LOCATION (X,Y COORDINATES)	APPROXIMATE SIZE (ACRES)[b]	GEOGRAPHIC AREA	BASIS	EBS SOURCE OF EVIDENCE[c]	REMEDIATION/ MITIGATION
			Housing Area	LBP may be present within perimeter soils of the buildings.		planned for FY 1997.
2-1000Q-A/L(P)	2,2	0.10	Buchanan Heights Housing Area	ACM confirmed by previous sampling and testing. LBP possible based on the age of the building. LBP may be present within perimeter soils of the building.	56, 55, 54	Asbestos abatement program is ongoing. LBP mitigation program planned for FY 1997.
2-1001Q-A/L	2,2	0.10	Buchanan Heights Housing Area	ACM confirmed by previous sampling and testing. LBP confirmed by previous sampling and testing. Additionally, LBP may be present within perimeter soils of the building.	56, 55, 26	Asbestos abatement program is ongoing. LBP mitigation program planned for FY 1997.
2-1002Q-A/L(P)	2,2	0.10	Buchanan Heights Housing Area	ACM confirmed by previous sampling and testing. LBP possible based on the age of the building. LBP may be present within perimeter soils in the building.	56, 55, 54	Asbestos abatement program is ongoing. LBP mitigation program planned for FY 1997.
2-1003Q-A/L	3,2	0.12	Buchanan Heights Housing Area	ACM confirmed by previous sampling and testing. LBP confirmed by previous sampling and testing. LBP may be present within perimeter soils of the building.	56, 55, 27	Asbestos abatement program is ongoing. LBP mitigation program planned for FY 1997.
2-1004 to 1006Q-A/L(P)	3,2	0.36	Buchanan Heights Housing Area	ACM confirmed by previous sampling and testing. LBP possible based on the age of the building. LBP may be present within perimeter soils of the building.	56, 55, 54	Asbestos abatement program is ongoing. LBP mitigation program planned for FY 1997.
2-1007Q-L	3,2	0.12	Buchanan Heights Housing Area	LBP confirmed by previous sampling and testing. Additionally, LBP may be present within perimeter soils of the building.	26, 27	LBP mitigation program planned for FY 1997.
2-1008 to 1010Q-A/L	3,2	0.31	Buchanan Heights Housing Area	ACM confirmed by previous sampling and testing. LBP confirmed by previous sampling and testing. Additionally, LBP may be present within perimeter soils of the building.	57, 55, 26	Asbestos abatement program is ongoing. LBP mitigation program planned for FY 1997.
2-1011Q-A/L	2,2	0.10	Buchanan Heights Housing Area	ACM confirmed by previous sampling and testing. LBP confirmed by previous sampling and testing. Additionally, LBP may be present within perimeter soils of the building.	57, 55, 26	Asbestos abatement program is ongoing. LBP mitigation program planned for FY 1997.
2-1012Q-A/L(P)	2,3	0.12	Buchanan Heights Housing Area	ACM confirmed by previous sampling and testing. LBP possible based on the age of the building. LBP may be present within perimeter soils of the building.	57, 55, 54	Asbestos abatement program is ongoing. LBP mitigation program planned for FY 1997.
2-1013Q-L	2,3	0.10	Buchanan Heights Housing Area	LBP confirmed by previous sampling and testing. Additionally, LBP may be present within perimeter soils of the building.	26	LBP mitigation program planned for FY 1997.
2-1014Q-L	2,3	0.12	Buchanan Heights Housing Area	LBP confirmed by previous sampling and testing. Additionally, LBP may be present within perimeter soils of the building.	26	LBP mitigation program planned for FY 1997.
2-1015Q-A/L	2,3	0.12	Buchanan Heights	ACM confirmed by previous sampling and	57, 55, 26	Asbestos abatement program is

Table 5-1b
(Continued)

QUALIFIED PARCEL NUMBER AND LABEL[a]	LOCATION (X,Y COORDINATES)	APPROXIMATE SIZE (ACRES)[b]	GEOGRAPHIC AREA	BASIS	EBS SOURCE OF EVIDENCE[c]	REMEDIATION/ MITIGATION
			Housing Area	testing. LBP confirmed by previous sampling and testing. Additionally, LBP may be present within perimeter soils of the building.		ongoing. LBP mitigation program planned for FY 1997.
2-1016Q-L(P)	3,3	0.10	Buchanan Heights Housing Area	LBP possible based on the age of the buildings. LBP may be present within perimeter soils of the buildings.	54	LBP mitigation program planned for FY 1997.
2-1017Q-A/L(P)	3,3	0.12	Buchanan Heights Housing Area	ACM confirmed by previous sampling and testing. LBP may be present within perimeter soils of the building.	57, 55	LBP mitigation program planned for FY 1997.
2-1018Q-A/L(P)	3,3	0.12	Buchanan Heights Housing Area	ACM confirmed by previous sampling and testing. LBP possible based on the age of the building. LBP may be present within perimeter soils of the building.	57, 55, 54	Asbestos abatement program is ongoing. LBP mitigation program planned for FY 1997.
2-1019Q-A/L	3,3	0.12	Buchanan Heights Housing Area	ACM confirmed by previous sampling and testing. LBP confirmed by previous sampling and testing. Additionally, LBP may be present within perimeter soils of the building.	57, 55, 26	Asbestos abatement program is ongoing. LBP mitigation program planned for FY 1997.
2-1020Q-L	3,3	0.12	Buchanan Heights Housing Area	LBP confirmed by previous sampling and testing. Additionally, LBP may be present within perimeter soils of the building.	26	LBP mitigation program planned for FY 1997.
2-1021Q-L(P)	3,3	0.12	Buchanan Heights Housing Area	LBP possible based on the age of the building. LBP may be present within perimeter soils of the building.	54	LBP mitigation program planned for FY 1997.
2-1022Q-A/L(P)	3,3	0.12	Buchanan Heights Housing Area	ACM confirmed by previous sampling and testing. LBP possible based on the age of the building. LBP may be present within perimeter soils of the building.	56, 55, 54	Asbestos abatement program is ongoing. LBP mitigation program planned for FY 1997.
2-1023Q-A/L	3,3	0.12	Buchanan Heights Housing Area	ACM confirmed by previous sampling and testing. LBP confirmed by previous sampling and testing. Additionally, LBP may be present within perimeter soils of the building.	57, 55, 26	Asbestos abatement program is ongoing. LBP mitigation program planned for FY 1997.
2-1024Q-A/L(P)	3,3	0.12	Buchanan Heights Housing Area	ACM confirmed by previous sampling and testing. LBP possible based on the age of the building. LBP may be present within perimeter soils of the building.	56, 55, 54	Asbestos abatement program is ongoing. LBP mitigation program planned for FY 1997.
2-1025Q-A/L	2,3	0.10	Buchanan Heights Housing Area	ACM confirmed by previous sampling and testing. LBP confirmed by previous sampling and testing. Additionally, LBP may be present within perimeter soils of the building.	57, 55, 26	Asbestos abatement program is ongoing. LBP mitigation program planned for FY 1997.
2-1026Q-L	3,3	0.10	Buchanan Heights Housing Area	LBP confirmed by previous sampling and testing. Additionally, LBP may be present within perimeter soils of the building.	26	LBP mitigation program planned for FY 1997.
3-800 to 802Q-L(P)	5,2	0.12	Las Colinas Housing Area	LBP possible based on the age of the buildings. LBP may be present within perimeter soils of the	54	LBP mitigation program planned for FY 1997.

Table 5-1b
(Continued)

QUALIFIED PARCEL NUMBER AND LABEL[a]	LOCATION (X,Y COORDINATES)	APPROXIMATE SIZE (ACRES)[b]	GEOGRAPHIC AREA	BASIS	EBS SOURCE OF EVIDENCE[c]	REMEDIATION/ MITIGATION
				buildings.		
3-803 to 804Q-L	5,2	0.16	Las Colinas Housing Area	LBP confirmed by previous sampling and testing. Additionally, LBP may be present within perimeter soils of the building.	26	LBP mitigation program planned for FY 1997.
3-805Q-A/L(P)	5,2	0.06	Las Colinas Housing Area	ACM confirmed by previous sampling and testing. LBP may be present within perimeter soils of the building.	55, 56	Asbestos abatement program is ongoing. LBP mitigation program planned for FY 1997.
3-808Q-L(P)	5,2	0.07	Las Colinas Housing Area	LBP possible based on the age of the building. LBP may be present within perimeter soils of the building.	54	LBP mitigation program planned for FY 1997.
3-809Q-L(P)	5,2	0.07	Las Colinas Housing Area	LBP possible based on the age of the building. LBP may be present within perimeter soils of the building.	54	LBP mitigation program planned for FY 1997.
3-810Q-L	4,3	0.06	Las Colinas Housing Area	LBP confirmed by previous sampling and testing. Additionally, LBP may be present within perimeter soils of the building.	26	LBP mitigation program planned for FY 1997.
3-811 to 814Q-L(P)	4,2	0.22	Las Colinas Housing Area	LBP possible based on the age of the buildings. LBP may be present within perimeter soils of the buildings.	54	LBP mitigation program planned for FY 1997.
3-815Q-L	4,2	0.06	Las Colinas Housing Area	LBP confirmed by previous sampling and testing. Additionally, LBP may be present within perimeter soils of the building.	26	LBP mitigation program planned for FY 1997.
3-816 to 817Q-L(P)	4,2	0.11	Las Colinas Housing Area	LBP possible based on the age of the buildings. LBP may be present within perimeter soils of the buildings.	54	LBP mitigation program planned for FY 1997.
3-818Q-A/L(P)	4,2	0.05	Las Colinas Housing Area	ACM confirmed by previous sampling and testing. LBP possible based on the age of the building. LBP may be present within perimeter soils of the building.	57, 55, 54	Asbestos abatement program is ongoing. LBP mitigation program planned for FY 1997.
3-819 to 821Q-L	4,2	0.18	Las Colinas Housing Area	LBP confirmed by previous sampling and testing. Additionally, LBP may be present within perimeter soils of the building.	26	LBP mitigation program planned for FY 1997.
3-822Q-L(P)	4,2	0.06	Las Colinas Housing Area	LBP possible based on the age of the building. LBP may be present within perimeter soils of the building.	54	LBP mitigation program planned for FY 1997.
3-823Q-L	4 ,2	0.06	Las Colinas Housing Area	LBP confirmed by previous sampling and testing. Additionally, LBP may be present within perimeter soils of the building.	26	LBP mitigation program planned for FY 1997.
3-824Q-L(P)	4,2	0.07	Las Colinas Housing Area	LBP possible based on the age of the buildings. LBP may be present within perimeter soils of the buildings.	54	LBP mitigation program planned for FY 1997.
3-826 to 828Q-L(P)	4,2	0.20	Las Colinas Housing Area	LBP possible based on the age of the buildings. LBP may be present within perimeter soils of the buildings.	54	LBP mitigation program planned for FY 1997.

Table 5-1b
(Continued)

QUALIFIED PARCEL NUMBER AND LABEL[a]	LOCATION (X,Y COORDINATES)	APPROXIMATE SIZE (ACRES)[b]	GEOGRAPHIC AREA	BASIS	EBS SOURCE OF EVIDENCE[c]	REMEDIATION/ MITIGATION
3-829Q-A/L(P)	4,2	0.07	Las Colinas Housing Area	ACM confirmed by previous sampling and testing. LBP possible based on the age of the building. LBP may be present within perimeter soils of the building.	57, 55, 54	Asbestos abatement program is ongoing. LBP mitigation program planned for FY 1997.
3-830 to 831Q-L(P)	4,2	0.12	Las Colinas Housing Area	LBP possible based on the age of the buildings. LBP may be present within perimeter soils of the buildings.	54	LBP mitigation program planned for FY 1997.
4-1245Q-L(P)	7,1	0.05	Coqui Gardens Housing Area	LBP possible based on the age of the building. LBP may be present within perimeter soils of the building.	54	LBP mitigation program planned for FY 1997.
4-1246Q-L	7,2	0.06	Coqui Gardens Housing Area	LBP confirmed by previous sampling and testing. Additionally, LBP may be present within perimeter soils of the building.	27	LBP mitigation program planned for FY 1997.
4-1251Q-A/L(P)	7,2	0.04	Coqui Gardens Housing Area	ACM confirmed by previous sampling and testing. LBP possible based on the age of the building. LBP may be present within perimeter soils of the building.	56, 55, 54	Asbestos abatement program is ongoing. LBP mitigation program planned for FY 1997.
4-1257Q-L(P)	7,2	0.05	Coqui Gardens Housing Area	LBP possible based on the age of the buildings. LBP may be present within perimeter soils of the buildings.	54	LBP mitigation program planned for FY 1997.
4-1258Q-L	7,2	0.05	Coqui Gardens Housing Area	LBP confirmed by previous sampling and testing. Additionally, LBP may be present within perimeter soils of the building.	26	LBP mitigation program planned for FY 1997.
4-1262Q-A/L(P)	7,2	0.06	Coqui Gardens Housing Area	ACM confirmed by previous sampling and testing. LBP possible based on the age of the building. LBP may be present within perimeter soils of the building.	56, 55, 54	Asbestos abatement program is ongoing. LBP mitigation program planned for FY 1997.
4-1263Q-L(P)	7,2	0.04	Coqui Gardens Housing Area	LBP possible based on the age of the building. LBP may be present within perimeter soils of the building.	54	LBP mitigation program planned for FY 1997.
4-1265Q-L(P)	7,2	0.06	Coqui Gardens Housing Area	LBP possible based on the age of the building. LBP may be present within perimeter soils of the building.	54	LBP mitigation program planned for FY 1997.
4-1266Q-A/L(P)	7,2	0.05	Coqui Gardens Housing Area	ACM confirmed by previous sampling and testing. LBP possible based on the age of the building. LBP may be present within perimeter soils of the building.	56, 55, 54	Asbestos abatement program is ongoing. LBP mitigation program planned for FY 1997.
4-1268Q-L	7,2	0.04	Coqui Gardens Housing Area	LBP confirmed by previous sampling and testing. Additionally, LBP may be present within perimeter soils of the building.	27	LBP mitigation program planned for FY 1997.
4-1270Q-L(P)	7,2	0.06	Coqui Gardens Housing Area	LBP possible based on the age of the building. LBP may be present within perimeter soils of the building.	54	LBP mitigation program planned for FY 1997.
4-1276Q-L(P)	7,2	0.06	Coqui Gardens	LBP possible based on the age of the building.	54	LBP mitigation program

Table 5-1b
(Continued)

QUALIFIED PARCEL NUMBER AND LABEL[a]	LOCATION (X,Y COORDINATES)	APPROXIMATE SIZE (ACRES)[b]	GEOGRAPHIC AREA	BASIS	EBS SOURCE OF EVIDENCE[c]	REMEDIATION/ MITIGATION
			Housing Area	LBP may be present within perimeter soils of the building.		planned for FY 1997.
4-1278 to 1279Q-L(P)	7,2	0.10	Coqui Gardens Housing Area	LBP possible based on the age of the buildings. LBP may be present within perimeter soils of the building.	54	LBP mitigation program planned for FY 1997.
4-1281Q-A/L(P)	7,2	0.05	Coqui Gardens Housing Area	ACM confirmed by previous sampling and testing. LBP may be present within perimeter soils of the building.	55	Asbestos abatement program is ongoing. LBP mitigation program planned for FY 1997.
4-1282Q-L(P)	7,2	0.04	Coqui Gardens Housing Area	LBP possible based on the age of the building. LBP may be present within perimeter soils of the building.	54	LBP mitigation program planned for FY 1997.
4-1284Q-L(P)	7,2	0.04	Coqui Gardens Housing Area	LBP possible based on the age of the building. LBP may be present within perimeter soils of the building.	54	LBP mitigation program planned for FY 1997.
4-1286Q-A/L(P)	7,2	0.05	Coqui Gardens Housing Area	ACM confirmed by previous sampling and testing. LBP may be present within perimeter soils of the building.	56, 55	Asbestos abatement program is ongoing. LBP mitigation program planned for FY 1997.
4-1287Q-A/L(P)	7,2	0.05	Coqui Gardens Housing Area	LBP possible based on the age of the building. LBP may be present within perimeter soils of the building.	54	LBP mitigation program planned for FY 1997.
4-1288Q-L	7,2	0.04	Coqui Gardens Housing Area	LBP confirmed by previous sampling and testing. Additionally, LBP may be present within perimeter soils of the building.	27	LBP mitigation program planned for FY 1997.
4-1289 to 1290Q-L(P)	7,2	0.10	Coqui Gardens Housing Area	LBP possible based on the age of the building. LBP may be present within perimeter soils of the building.	54	LBP mitigation program planned for FY 1997.

Notes:

[a] BRAC parcel label definitions are as follows:

PS = petroleum storage
PR = petroleum release or disposal
HS = hazardous substance storage
HR = hazardous substance release or disposal

Qualified parcel label definitions are as follows:

A = asbestos-containing material
L = lead-based paint
P = polychlorinated biphenyls
R = radon
X = UXO and/or ordnance fragments
RD = radionuclides
(P) = possible (unverified)

[b] Acreage figures are approximate; they have been calculated using AutoCad Release 12.

[c] EBS Source of Evidence numbers refer to documents listed in Table 2-1 of this report.

Table 5-1b
(Continued)

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APPENDIX A

COMMENT RESPONSE PACKAGE

RESPONSES TO COMMENTS ON THE

FORT BUCHANAN, PUERTO RICO
DRAFT ENVIRONMENTAL BASELINE SURVEY REPORT
DATED MARCH 7, 1996

APPENDIX A
COMMENT RESPONSE PACKAGE

Appendix A presents the comments Woodward-Clyde Federal Services received on the *Fort Buchanan, Puerto Rico Draft Environmental Baseline Survey Report*, dated March 7, 1996, and the *Draft Final Environmental Baseline Survey Report*, dated November 8, 1996, and the responses to these comments.

The comments have been typed verbatim and may include misspellings, grammatical errors, format inconsistencies, internal agency numbering systems, etc. Each comment and response has been sequentially numbered (A-1, A-2, A-3, etc., for comments on the draft report and B-1, B-2, B-3, etc., for comments on the draft final report). This numbering system is used to reference previous comments or a response that may clarify a previously addressed issue.

The comments have been organized by agency and are separated by sections (A.1, A.2, A.3, etc., for comments on the draft report and B.1, B.2, B.3, etc., for comments on the draft final report). The comments are presented in the following order:

- Installation
  - Director of Public Works
  - Director of Public Works, Environmental Division
- U.S. Environmental Protection Agency
- Commonwealth of Puerto Rico
- U.S. Army Forces Command
- U.S. Army Environmental Center
- U.S. Army Corps of Engineers
- Other Agencies and Organizations

A.1 RESPONSES TO INSTALLATION COMMENTS ON THE DRAFT EBS REPORT

A.1.1 RESPONSES TO DIRECTOR OF PUBLIC WORKS, FORT BUCHANAN COMMENTS ON THE DRAFT EBS REPORT

ENTITY:	Executive Officer, Headquarters; Fort Buchanan Deputy Installation Commander, Headquarters; Fort Buchanan Commander, Headquarters, Fort Buchanan
INDIVIDUAL:	Gregory M. Huckabee
TITLE:	Staff Judge Advocate
DATE:	July 22, 1996

Comment A-1:

1a. On p. 1-9, Hydrology, the report fails to note the existence of extensive sewage discharge emanating from deteriorated sewer transfer pipes owned and operated by PRASA;

Response:

Comment noted. However, it would be inappropriate to include a discussion of the deteriorating condition of the sewer transfer pipes in Section 1.5.4, Hydrology, which provides a description of the physical hydrologic conditions at the installation. Section 3.4.7, Sewage Treatment, has been expanded to acknowledge the pipes' deteriorating condition. Section 4.3.1.6, Residential Area South of Fort Buchanan, has been expanded to describe the results of the water quality samples collected from El Toro Creek, and Section 4.5.2, Ongoing Remediation Efforts, describes the corrective action activities currently being conducted at the installation to repair/replace existing sewage transfer piping.

Comment A-2:

1b. On p. 4-7, Building 746 is inhabited by a unit from the Department of Justice, not the CIDC;

Response:

Comment noted. The text has been revised accordingly.

Comment A-3:

1c. On p. 4-18, Residential Area South of Fort Buchanan, the report does not adequately identify or discuss the pervasive nature and extent of sewage discharge, nor does it address its affect on all BRAC housing areas especially in view of the MTF Preventive Medicine report dated 27 Feb 1996 or the water quality samples report dated 29 Mar 1996.

Response:

See the response to Comment A-1.

Comment A-4:

2. Request you contact appropriate authorities to explain our perceived deficiencies in the contractor's report with a request for corrective action.

Response:

Comment noted.

A.1.2 RESPONSES TO DIRECTOR OF PUBLIC WORKS, FORT BUCHANAN COMMENTS ON THE DRAFT EBS REPORT

ENTITY: Fort Buchanan

INDIVIDUAL: Colonel Donald R. Riedel

TITLE: Installation Commander

DATE: July 22, 1996

Comment A-5:

a. Is there a potential EPA/EQB problem at building 138?

Response:

A soil sampling and analysis investigation may be warranted to determine the presence or absence of contaminants. It should be noted that this area has not been identified for transfer or lease. Currently, the installation is conducting an investigation of the tanks located at Building 138. The location and orientation of the tanks have been determined. A plan to remove the tanks and obtain closure from the regulators is in progress.

Comment A-6:

b. Were there any “surprises” in the draft EBS?

Response:

The Draft EBS Report did not uncover any surprises.

Comment A-7:

c. What are our plans to address any “surprise” EBS findings?

Response:

Not Applicable.

Comment A-8:

d. Ensure we’ve addressed stuff which was not a surprise, “old news” and that we continue to proceed with appropriate action as necessary on “old news” items.

Response:

Appropriate actions will be taken as necessary.

Comment A-9:

2. There was also some word smithing which the CDR wants done. See the CDR's note and the changes I have made to the draft (enclosed).

Response:

The text has been revised accordingly.

Comment A-10:

CDR's note: 1. Sentence 2, page i, para 1
Incorrect (omit sentence)

Response:

The text has been revised accordingly.

Comment A-11:

CDR's note: 2. Sentence 2, page i, para 2
Incorrect

Response:

The text has been revised accordingly.

Comment A-12:

CDR's note: 4. Sentence 1, Page 1-1, para 2
Incorrect

Response:

The text has been revised accordingly.

Comment A-13:

CDR's note: 5. Para 4, page 2-8
DEH USAG?

Response:

The text has been revised accordingly.

A.1.3 RESPONSES TO DIRECTOR OF PUBLIC WORKS, ENVIRONMENTAL DIVISION, FORT BUCHANAN COMMENTS ON THE DRAFT EBS REPORT

ENTITY:	Department of Public Works, Environmental Division, Fort Buchanan
INDIVIDUALS:	Angel A. Perez and Felix Mariani
TITLE:	BRAC Environmental Coordinator and Assistant BRAC Environmental Coordinator
DATE:	July 22, 1996

Comment A-14:

1. 746 acres not 735

Response:

The text has been revised accordingly.

Comment A-15:

2. Section 4 - para. 4.1.1
Solid Waste Mgt. Unit #1 - Closure Plan is available with Bldg 596, Bldg 539

Response:

The last sentence of this paragraph has been deleted.

Comment A-16:

3. Section 4 - Para. 4.1.10 65th ARCOM
Parking Area - no permission for fueling operations were ever given, only for temp parking

Response:

The text has been revised accordingly.

A.2 RESPONSES TO U.S. ENVIRONMENTAL PROTECTION AGENCY COMMENTS ON THE DRAFT EBS REPORT

A.2.1 RESPONSES TO U.S. ENVIRONMENTAL PROTECTION AGENCY, REGION 2 COMMENTS ON THE DRAFT EBS REPORT

ENTITY: U.S. Environmental Protection Agency, Region 2

INDIVIDUAL: William P. Lawler, P.E.

TITLE: Base Closure Team Member

DATE: July 22, 1996

Comment A-17:

1. The CERFA parcel category definitions differ from those contained in the 1993 Department of Defense (DoD) BRAC Cleanup Plan Guidebook referenced in the EBS. If other guidance documents are being utilized for these definitions, we recommend that they be specifically referenced and/or attached to the EBS. Otherwise, we recommend that the category definitions specified in the DoD's 1993 BRAC Cleanup Plan Guidebook be utilized without modification.

Response:

The definitions of the seven environmental condition of the property area types used in the EBS are consistent with the *BRAC Cleanup Plan (BCP) Guidebook* (DOD 1993); however, a more detailed description has been presented. Several CERFA guidance documents including CERCLA §120(h)(4); OSWER Directive 9345.0-09, EPA 540/F-94/32, PB 94-963249, April 19, 1994; and Appendix C of the *BCP Guidebook* (DOD 1993) were used by the U.S. Army to develop the more detailed description.

Comment A-18:

2. The potential for migration of contaminants to the housing area properties from nearby present and former landfills and other sources needs to be addressed more thoroughly. The EBS discusses the limited information that is known about only two landfills located in proximity to the parcels under consideration. However, rather than just two landfills, Figures 1-1 and 1-2 indicate that there are a variety of possible areas that should be addressed in the EBS (i.e., the Old Landfill, the Active Landfill, the Active Controlled Dump Site, and two (2) Former Uncontrolled Dump Sites located in the Las Colinas and Buchanan Heights areas). In addition, the EBS indicates that an underground storage tank (UST) associated with Building 746 needs to be investigated

further. Therefore, we recommend that the potential for contaminants from each of these possible sources to migrate to nearby areas be determined.

Response:

The Active Dump Site was incorrectly referred to as a landfill. The text has been revised accordingly. There is only one landfill at Fort Buchanan; it is located southeast of Buchanan Heights. Installation personnel anticipate initiating a focused investigation to confirm the presence or absence of hazardous materials within the landfill and to evaluate the potential for releases to groundwater. The text has been revised accordingly.

There is no documented evidence to indicate that the four dump sites located at Fort Buchanan pose environmental concerns. Interviews indicate that these areas were used for the disposal of nonhazardous materials—primarily grass cuttings and construction debris. The debris has been removed, and a visual inspection revealed no signs of stressed vegetation or environmental concerns.

Installation personnel anticipate initiating an investigation/cleanup for an area located behind Building S-18 (in the Intermediate School Area) in the near future. This area is where discarded paint cans were observed, and it is rumored that hazardous materials are buried. Any contamination in this area, if present, would not impact the family housing areas.

The UST associated with Building 746 is scheduled to be removed in mid-November 1996. Integrity testing indicated that the tank was in good condition, and no visual evidence of leaking was observed. Closure will depend on the evaluation of analytical results from confirmation samples collected from beneath the tank and approval from the regulatory community. The text has been revised to include this information.

Comment A-19:

3. The EBS indicates that the base has been used as a military training and maneuver area for over 70 years, but it does not indicate what areas are likely to have elevated levels of lead from firing ranges and/or maneuvers. As a result, while it is possible that the EBS is correct in stating that the lands on which the 4 housing areas are located were always “unused lands” prior to their construction, we recommend that the possibility of encountering lead-contaminated soils be specifically evaluated. Perhaps additional historical information that could address this concern is available from the 1978 cultural resources studies mentioned on page 3-28 of the EBS, or from some of the source documents referenced in it.

Response:

There is no documented evidence to indicate the presence or possible presence of ordnance or associated fragments at any of the housing unit areas. Construction activities conducted in these areas did not encounter any ordnance materials. However, the western portion of the present golf course driving range was identified and documented in Section 4.2.8 of the Draft

EBS Report as a potential former small arms firing range, and an area near the Maxie Williams Jr. Ballfield was identified and documented in Section 4.4.5 of the Draft EBS Report as a former ordnance area. Neither of these areas is subject to transfer or lease under the BRAC process.

A.3 RESPONSES TO COMMONWEALTH OF PUERTO RICO COMMENTS ON THE DRAFT EBS REPORT

A.3.1 RESPONSES TO COMMONWEALTH OF PUERTO RICO COMMENTS ON THE DRAFT EBS REPORT

ENTITY:	Commonwealth of Puerto Rico Office of the Governor Environmental Quality Board
INDIVIDUAL:	Mr. Benito Colón Del Toro
TITLE:	Geologist
DATE:	July 28, 1996

Comment A-20:

- The Golf Course Area should be included to identify the possible presence of unexploded ordnance.

Response:

The western portion of the present golf course driving range was identified and documented in Section 4.2.8 of the Draft EBS Report as a potential former small arms firing range. An area near the Maxie Williams Jr. Ballfield was identified and documented in Section 4.4.5 of the Draft EBS Report as a former ordnance area. Neither of these areas is subject to transfer or lease under the BRAC process.

Comment A-21:

- Although issues concerning UST's, AST's and petroleum products are under ongoing remediation efforts, the potential of the existence of two unknown UST's located south of building 138 should be addressed.

Response:

An investigation was initiated in July 1996. The location and orientation of two 5,500 to 6,000-gallon tanks containing fuel oil have been determined. Stained soil was observed indicating the tanks have leaked. The tanks are scheduled to be removed, and a closure plan is in progress. The text has been revised to include this information.

Comment A-22:

- The area within the Auto Hobby Shop (Building S-159), the west side of building T-159 and the building 556, that has been documented to present stressed vegetation and leaking drums, should be included to be environmentally characterized.

Response:

The reference to Building T-159 as the auto hobby shop in Section 4.2.7 in the Draft EBS Report was in error. Building S-159 is the current auto hobby shop. The text has been revised accordingly.

DPW personnel indicated that the drums stored at Building S-159 have been removed. Analytical results from samples collected indicated that the drums contained used motor oil with no hazardous waste components. Vermiculite was used to absorb any free oil from the pavement surface where the drums were stored. The pavement surface was then scraped and the wastes disposed of appropriately. The text has been revised to include this information.

Two areas associated with Building 556 have been identified as solid waste management units (SWMUs) under the current environmental program. The southwest portion of the 556 yard is SWMU 4, and the northwest side of Building 556 is SWMU 5.

Comment A-23:

- Regarding sampling and analysis recommendations:
  A diagram with all sampling locations with its rationale should be included.

Response:

The purpose of the Sampling and Analysis Recommendations (SAR) is to provide general guidance and a cost estimate. Specific information, such as the sampling methods, tools, and locations, would be detailed in a sampling plan.

A.4 RESPONSES TO U.S. ARMY FORCES COMMAND COMMENTS ON THE DRAFT EBS REPORT

ENTITY: U.S. Army Forces Command

INDIVIDUAL: Joseph H. Plunkett

TITLE: Chief, Base Realignment and Closure Division, DCSPIM

DATE: July 22, 1996

Comment A-24:

Page: I
Section: Executive Summary

In several places in the Executive Summary and Section 1, the acreage to be excessed is changed from 99 to 60. However, the 39 acre difference is not indicated on the maps. Do some or part of the housing areas on the CERFA Parcel Designation Map (Figure 5-1) require modification or is the cited 99 acres a misprint. Please clarify.

Response:

Acreage inconsistencies will be corrected; however, it should be noted that approximate acreages were calculated using AutoCad Release 12 and do not represent surveyed acreages. Additionally, revisions to the draft final CERFA map based on comments received on the Draft EBS Report will result in new acreage estimates.

Comment A-25:

Page: 1-5
Section one: last sentence (dot)

Reserve enclave should be Retained Army Property.

Response:

"Reserve Enclave" has been revised to "Retained Army Property."

Comment A-26:

Page: 1-7 and 1-8
Section one paragraph 1.5 and 1.52

734 acres should be 746

Response:

The text has been revised accordingly.

Comment A-27:

Page: Table 1-1
Section: Total figure

Total should equal 746 and not 734

Response:

The text has been revised accordingly.

Comment A-28:

Page: 3-1
Section 3.2 last paragraph

735 should be 746

Response:

The text has been revised accordingly.

Comment A-29:

Page 3-15
Section 3.3.14

34 acres should be 21.76 acres.
Why is Coconut Grove Formerly known as Officer Wherry Housing?

Response:

It should be noted that the estimated acreages used in the Draft EBS Report were calculated using AutoCad Release 12 and the digitized base map. The estimated acreages correspond to the geographic areas illustrated in Figures 1-2 and 5-1. We do not know if the acreage cited in the comment corresponds to the residences only with no buffer. If the acreage cited represents the actual property intended for realignment, we will expand the text to indicate as such. Please clarify.

Coconut Grove was previously known as Officer Wherry Housing. Figure 5-1 has been revised to include the current names of the housing units.

Comment A-30:

Page 3-16
Section 3.3.15 and 3.3.16

3.3.15 15 acres should be 22 acres

3.3.16 34 acres should be 11.257 acres

Response:

See the response to Comment A-29.

Comment A-31:

Page: 3-17
Section 3.17
16 acres should be 11.68 acres

Response:

See the response to Comment A-29.

Comment A-32:

Page 3-3
Section three
The following updated of all tenant activities on Ft. Buchanan should replace the list on the report.

UIC	UNIT
WOU828	GAR HQ USA GARRISON
W3QM03	HEALTH CLINIC TENANTS
W3QM05	DENTAL CLINIC
GE1001	NAF MWR FUND
WOU803	FULL TIME CONTRACT
IOU815	US POSTAL SERVICE
W3QM04	VET BRANCH
IOU813	ANTILLES CONS SCHOOL
032801	AAFES MAIN STORE
DCSR54	DEF COMMISSARY
W7PAA	NG USP&FO
W3LD15	RGN3RD USACIDC
WBU61A	902 MI HHCGRP
W49U04	2D ARMY TM RTT(RG)
W4MOIC	PERS SPT ELE, (RG)
W4MTA6	RES SPT GRP, RG
W49002	DFAS INDIANAPOLIS

UIC	UNIT
USAF10	AIR FORCE USAFLO
IOU 16	DEPT OF JUSTICE
IOU822	US CUSTOMS
SOU805	CU/SATO
IOU801	INTERNAL REVENUE
IOU802	INS/IMMIGR/NATUR
XXXXX	BANCO POPULAR
	SUBTOTAL
	RESERVE UNITS:
W7REAA	HQ, 65TH ARCOM
WZL899	6 AUG HHD BDE (FLD EX)
WZMK99/	348 AUG BN (CS FE) 6BDE
WRONAA	338 FI BN FINANCE
W4MOAA	ARPENCN LIAISON OFC
WVE8AA	407TH MED CO (AMB)
WRYAAO	A CO, 448TH EN BN
WRYATO	HSC, 448TH EN BN
WRYABO	B CO, 448TH EN BN CMBT
WSKVAA	301 MP CO CPT SPT
WVHMA1	276 MAINT CO (DS) DET 1
WSZ2AA	268 TC CO LT TRUCK 5T
WZN9AA	973 QM CO FLD SVC GS
W3EN08	AMSA 161 DS/GS

Response:

The text has been revised accordingly.

Comment A-33:

Page: 3-9
Section 3.4.2

Sentence should read: “This information conflicts with an interview with former base personnel stating that uncontrolled dumping of paint, oil drums, and other possibly hazardous materials were periodically observed within the land fill right next to a housing area.

Response:

We do not concur. The old landfill is located southeast of the Buchanan Heights Family Housing Area but not right next to it. Additionally, the text in Section 4.2.2 incorrectly states that the old landfill is upgradient of Buchanan Heights. Considering the primary hydrologic flow direction is north-northeast, it would not appear that the old landfill is upgradient. The text has been revised accordingly.

Comment A-34:

Page: 3-28
Section three first paragraph

Are we getting rid of every habitat?

Response:

The native vegetation areas located south of each of the housing areas will be retained as U.S. Army property. The text incorrectly identified the area south of Los Colinas as subject for disposal; however, installation personnel have indicated that this area will also be retained. The text has been revised accordingly.

Comment A-35:

Page: 4-1
Section 4.0

734 acres should be 746 and 99 acres should be 60 acres.

Response:

The total acreage of the installation has been changed to 746; however, an estimate of the acreage to be realigned will be recalculated using AutoCad Release 12 unless the actual acreage can be provided.

Comment A-36:

Page: 4-18
Section four

El Toro Creek goes through Coqui Gardens, PRASA is under an EPA order to eliminate serious pollution of the creek and to rebuild their sewer line. For Buchanan people say this is a serious health threat. This should be reflected in this report. Should this be something other than Category 1.

Response:

The text has been revised to include a discussion of the environmental concerns associated with El Toro Creek. Section 3.4.7, Sewage Treatment, has been expanded to acknowledge the sewer transfer pipes' deteriorating condition; Section 4.3.1.6, Residential Area South of Fort Buchanan, has been expanded to describe the results of the water quality samples collected from El Toro Creek; and Section 4.5.2, Ongoing Remediation Efforts, describes the corrective action activities currently being conducted at the installation to repair/replace the existing sewage transfer piping. However, we do not agree that current conditions pose a health threat to Coqui Gardens, nor that the Category 1 designation for Coqui Gardens is incorrect.

Comment A-37:

Page: 4-19
Section: 4.4.2

In this section it only identifies the existence of lead-based paint in these quarters. It is important to note that approximately all homes built before 1978 contain lead-based paint and the concern is not the existence of the paint but whether it is considered hazardous due to peeling or deteriorating conditions. The condition of the paint if noted, should be presented in this report to provide complete information on the lead-based paint concern.

Response:

Existing LBP survey information was provided in the report. However, visual inspection and interviews with installation personnel indicate that the painted surfaces are in good condition. The text has been expanded to note this.

Comment A-38:

Page: 4-7 to 4-8
Section 4.2.2

The report states that there have been no investigations to determine if there are hazardous materials in a landfill up-gradient from one of the housing areas. A former employee talks about uncontrolled dumping. There is another landfill that is also "up-gradient" and a former "uncontrolled dump site" inside one of the housing areas. Should any of this cause any of the parcels to be something other than Category 1.

Response:

The Active Dump Site was incorrectly referred to as a landfill. The text has been revised accordingly. There is only one landfill at Fort Buchanan, located southeast of Buchanan Heights. Installation personnel anticipate initiating a focused investigation to confirm the presence or absence of hazardous materials within the landfill and potential releases to groundwater. The text incorrectly states that the old landfill is upgradient of Buchanan Heights. Considering the primary hydrologic flow direction is north-northeast, it would not appear that the old landfill is upgradient. The text has been revised accordingly.

There is no documented evidence to indicate the four dump sites located at Fort Buchanan pose environmental concerns. Interviews indicate these areas were used for the disposal of nonhazardous materials—primarily grass cuttings and construction debris. The debris has been removed, and a visual inspection revealed no signs of stressed vegetation or environmental concerns.

Installation personnel anticipate initiating an investigation/cleanup for the area south Building S-18 in the near future. This area is where discarded paint cans were observed, and it is rumored that hazardous materials are buried. Any contamination in this area, if present, would not impact the family housing areas.

Comment A-39:

Page: 4-27
Section 4.6

Second and third sentence should read: All remaining property will not be excessed. Retained U.S. Army property is identified by a cross batch on figure 5-1 on this report.

Response:

The text has been revised accordingly.

Comment A-40:

Page: 5-3
Section 5.1.7

It is stated that two areas (BRAC Parcel Labels 5(7) and 6(7) were designated as Category 7 due to use of a used oil/diesel fuel/herbicide mixture to control vegetation on the perimeter fences in these areas 15-plus years ago. It should be noted that petroleum herbicide or pesticide mixtures were a common practice for agricultural and southern area of the United States for decades. This practice does not appear to warrant a consideration for an unusual situation for this area. Another reason cited for this classification was that chlordane was used on Ft. Buchanan prior to the early 1980s. Chlordane was also a commonly-used pesticide throughout the United States prior to the early 1980s. Further, there is no cited evidence of stressed vegetation to indicate an environmental concern. Finally, chlordane is not cited to be used in this area. Suggest all these factors be used to reclassify these areas as suitable to transfer.

On the Area/Facility Map (Figure 1-2) and CERFA Parcel Designation Map (Figure 5-1), the term "Field" is misspelled several times. Suggest these typographical errors be corrected.

Response:

We concur that the application of chlordane as a pesticide should not disqualify the parcel from being designated as Category 1. Pesticides are a consumer product if applied in a manner consistent with the standards for licensed application. However, the application of an oil/diesel fuel/herbicide mixture as a herbicide, though common practice at government installations in the past, would not be within the manufacturer's specifications. Therefore, the text has been revised by removing the use of chlordane as a reason for the Category 7 designation. It should be noted that a minimal surface soil investigation would provide sufficient information to identify the categorization. Additionally, our current understanding is that the area south of the Los Colinas Family Housing Area (previously identified as BRAC Parcel 5(7)) will be retained as U.S. Army property and, therefore, will not be parcelized in the Draft Final EBS Report.

Comment A-41:

Analytical method 8015B TPH for gasoline and diesel fraction should be used instead of 8015.

Response:

We concur.

Comment A-42:

Method 8080A should include the organochloride pesticide and PCB's by gas chromatography.

Response:

We concur.

A.5 RESPONSES TO U.S. ARMY ENVIRONMENTAL CENTER COMMENTS ON THE DRAFT EBS REPORT

The U.S. Army Environmental Center did not comment on the Draft EBS Report.

A.6 RESPONSES TO U.S. ARMY CORPS OF ENGINEERS COMMENTS ON THE DRAFT EBS REPORT

The U.S. Army Corps of Engineers did not comment on the Draft EBS Report.

A.7 RESPONSES TO OTHER COMMENTS ON THE DRAFT EBS REPORT

No other agencies or organizations commented on the Draft EBS Report.

RESPONSES TO COMMENTS ON THE

FORT BUCHANAN, PUERTO RICO
DRAFT FINAL ENVIRONMENTAL BASELINE SURVEY REPORT
DATED NOVEMBER 8, 1996

B.1 RESPONSES TO INSTALLATION COMMENTS ON THE DRAFT FINAL EBS REPORT

B.1.1 RESPONSES TO DIRECTOR OF PUBLIC WORKS, FORT BUCHANAN COMMENTS ON THE DRAFT EBS REPORT

The Executive Officer, Headquarters; Deputy Installation Commander, Headquarters; and Commander, Headquarters, Fort Buchanan did not comment on the Draft Final EBS Report.

B.1.2 RESPONSES TO DIRECTOR OF PUBLIC WORKS, FORT BUCHANAN COMMENTS ON THE DRAFT FINAL EBS REPORT

The installation Commander did not comment on the Draft Final EBS Report.

B.1.3 RESPONSES TO DIRECTOR OF PUBLIC WORKS, ENVIRONMENTAL DIVISION, FORT BUCHANAN COMMENTS ON THE DRAFT FINAL EBS REPORT

ENTITY:	Department of Public Works, Environmental Division, Fort Buchanan
INDIVIDUAL:	Angel A. Perez and Felix Mariani
TITLE:	BRAC Environmental Coordinator and Assistant BRAC Environmental Coordinator
DATE:	December 5, 1996

The following comments were discussed at a BRAC Draft Final EBS Report Review Meeting at Fort Buchanan, Puerto Rico, December 5, 1996. In attendance were:

Name	Title
Angel Perez	BRAC Environmental Coordinator, Environmental Office, Directorate of Public Works, Fort Buchanan, Puerto Rico
Felix Mariani	Environmental Protection Specialist, Directorate of Public Works, Fort Buchanan, Puerto Rico
Benito Colon Del Toro	Commonwealth of Puerto Rico, Office of the Governor, Environmental Quality Board
Kathleen Power	Woodward-Clyde, Environmental Baseline Survey (EBS) Coordinator

Comment B-1:

Page 1-9, Section 1.5.2, second line - typographical error; 734 acres should be 746 acres.

Response:

Comment noted. The text has been revised accordingly.

Comment B-2:

Page 2-12, Section 2.1.2.2, first bullet - the boxes located outside of Building 607, containing photographic developing chemicals, have been removed.

Response:

Comment noted. The text has been revised accordingly.

Comment B-3:

Page 4-7, Section 4.2.1, second paragraph - the transformer associated with Building 746 was tested for PCB content. The results indicated that no PCBs are present.

Response:

Comment noted. The text has been revised accordingly.

Comment B-4:

Page 4-28, Section 4.5.3, second paragraph - the UST previously located north of Building 376 was 275-gallon capacity tank, not 1,000 gallons as stated in the text. The tank has been removed.

Response:

Comment noted. The text has been revised accordingly.

Comment B-5:

Building 746 will be retained by the Army, and, therefore, is not considered BRAC property.

Response:

Comment noted. The text, tables, and Figure 5-1 have been revised accordingly.

Comment B-6:

Elevated levels of benzene (exceeding 0.5 ppb) were detected in a groundwater monitoring well located in the northern portion of the installation, south of Building 618 (within non-BRAC property). Installation personnel cannot identify the source of contamination and suspect the Caribbean Petroleum Refinery's tank farm, located west of Fort Buchanan, as a potential source. Mr. Colon Del Toro stated that he was in the process of reviewing a RCRA Facility Investigation report for this refinery and found that the groundwater flow in this area was complicated because of a karst environment. A second groundwater monitoring well is located potentially downgradient of the refinery, but up gradient of the monitoring well where benzene was detected. This monitoring well was dry during the same sampling period.

Response:

This information has been incorporated into the text, as appropriate.

B.2 RESPONSES TO U.S. ENVIRONMENTAL PROTECTION AGENCY COMMENTS ON THE DRAFT FINAL EBS REPORT

The U.S. Environmental Protection Agency did not comment on the Draft Final EBS Report.

B.3 RESPONSES TO COMMONWEALTH OF PUERTO RICO COMMENTS ON THE DRAFT FINAL EBS REPORT

B.3.1 RESPONSES TO COMMONWEALTH OF PUERTO RICO COMMENTS ON THE DRAFT FINAL EBS REPORT

ENTITY:	Comments of Puerto Rico Office of the Governor Environmental Quality Board
INDIVIDUAL:	Mr. Benito Colón Del Toro
TITLE:	Geologist
DATE:	December 5, 1996

See Section B.1.3 and Comments B-1 through B-6.

B.4 RESPONSES TO U.S. ARMY FORCES COMMAND COMMENTS ON THE DRAFT FINAL EBS REPORT

The U.S. Army Forces Command did not comment on the Draft Final EBS Report.

B.5 RESPONSES TO U.S. ARMY ENVIRONMENTAL CENTER COMMENTS ON THE DRAFT FINAL EBS REPORT

The U.S. Army Environmental Center did not comment on the Draft Final EBS Report.

B.6 RESPONSES TO U.S. ARMY CORPS OF ENGINEERS COMMENTS ON THE DRAFT FINAL EBS REPORT

The U.S. Army Corps of Engineers did not comment on the Draft Final EBS Report.

B.7 RESPONSES TO OTHER COMMENTS ON THE DRAFT FINAL EBS REPORT

No other agencies or organizations commented on the Draft Final EBS Report.

APPENDIX B

DATABASE SEARCH REPORTS OF FEDERAL, STATE, AND LOCAL GOVERNMENT RECORDS

APPENDIX C

SAMPLE INTERVIEW FORM

FORM 3 - INTERVIEWS

Installation Code: ________; Area: _________________________; Parcel: ___________;
Facility No. : _________________; Facility Name: ____;
Map ID: _________; Coordinates: ____________; Address: ___________________________________;
Team Member Name: _____________________________________; Date: _____________

<u>Interviewee Information:</u>
Name:____________________________; Organization: _______________; Title: __________________;
Role/Responsibility: _______________________________________; Phone: ______________________;
Period for which the person would have specific and detailed knowledge of the area or facility in question: _________________________
Any other areas or facilities for which the person would have specific and detailed knowledge?
Area or Facility Period:
1) ____
2) ____
3) ____

Who can I talk to regarding previous uses or processes of this area/facility?
Period: ________________Contact: ____
Period: ________________Contact: ____
Period: ________________Contact: ____
Period: ________________Contact: ____
Period: ________________Contact: ____

TABLE I-1: FACILITIES WITH COMMON USE OR PURPOSE

FACILITY NO.	FACILITY NAME	DATE CONSTRUCTED	DATE EXPANDED

Installation Code: ________; Area: ___________________; Parcel: __________; Facility No: _________
Team Member Name: ________________________________; Date: ____________
Interviewee: ____________________________

USE HISTORY

Use the following questions to complete Table I-2. Include historical perspective on disposal practices and locations, and state amounts of stored chemicals and wastes in the comments column.

Was or is the area/facility in question used as a gasoline station, motor or machine fabrication or repair facility, dry cleaners, photo developing laboratory, plating shop, paint shop, electronics or electro-optical manufacturing or repair facility, medical or dental facility, training area, or as a waste treatment, disposal (such as junkyard or landfill), processing, or recycling facility? Y/N

Was or is the area in question used as a firing and/or bombing range? Y/N

Describe the use history of this area or facility, including the processes for which the area or facility was used.

Describe the process chemicals and petroleum products which have been or are **used** in this facility or area?

Describe the process chemicals and petroleum products which have been or are **stored** in this facility or area, and where these materials are stored.

Describe any pesticides, paints, or other chemical containers, or damaged or discarded automotive or industrial batteries which have been or are located, stored, or used in this facility or area.

Describe any other drums, sacks, or cartons containing chemicals located in this facility or area.

Describe the wastes which have been or are generated in this facility or area, and the rates at which these wastes were and are generated.

Describe chemical or petroleum products wastes which have been or are stored in this facility or area, the amounts of stored wastes, and where these wastes are stored.

Does the facility generate used oil? Y/N

Were or are radioactive elements (such as radium, uranium) used in a manufacturing process or contained in machinery/devices which were repaired? Y/N If yes, what are the radioactive elements? Where were/are raw materials stored? Where were/are wastes disposed? Can you provide copies of permits? Y/N

Is or was mercury used or contained in any machinery parts, or electrical, pressure, or vacuum instruments? Y/N

Installation Code: ________; Area: ____________________; Parcel: __________; Facility No: _________
Team Member Name: ________________________________; Date: ____________
Interviewee: ____________________________

TABLE I-2: AREA OR FACILITY USE HISTORY

PERIOD	USE/PROCESS	CHEMICALS / PETROLEUM PRODUCTS USED OR GENERATED	TYPE[1]	CLASS[2]	GEN. RATE	STORAGE[3]	DISPOSAL

1 - P = process, W = waste, C = cleaning, O = other such as pesticides and paint stored for incidental use.
2 - PP = petroleum product, HS = hazardous substance.
3 - Identify specific location in area or facility. For USTs and ASTs use Table I-3.

Installation Code: ________; Area: ____________________; Parcel: __________; Facility No: _________
Team Member Name: ________________________________; Date: ____________
Interviewee: ____________________________

UST AND AST INVENTORY

Have there been or are there any above ground or under ground storage tanks containing hazardous substances or petroleum products located on the installation/area/facility? Y/N If yes, can you provide a complete list of all tanks, a tank location map, and a copy of all permit(s)? Y/N If yes, Document ID: _________; otherwise complete:

TABLE I-3: UST AND AST INVENTORY

TANK NO.	UST or AST	YEAR INSTALLED	CAPACITY/ (GAL) CONSTRUCTION	CONTENTS	CLASS[1]	STATUS	SITE NO.	FUTURE ACTIONS	COMMENTS[2]

1 - PP = petroleum product, HS = hazardous substance.

2 - Include compliance monitoring, if present, and results.

Installation Code: ________; Area: ___________________; Parcel: __________; Facility No: _________
Team Member Name: ________________________________; Date: ____________
Interviewee: ____________________________

POTENTIAL RELEASES

To the best of your knowledge, have spills, leaks or other releases of hazardous substance or petroleum products occurred in this facility or area? Y/N If yes, What chemical or petroleum product was released?
____
How much was released? ______________; Map ID:_______________; Coordinates: _______________
Is or was an investigation and remedial action conducted? Y/N *If yes, enter required information into Table I-4.*

Are or have liquid or solid wastes or debris including tires, automotive or industrial batteries, ordnance or any other waste materials been Dumped, Buried, Burned, or Discharged (circle one or more) in this area? Y/N/U
If yes, What materials? ____
Period? ________________; Map ID:________________; Coordinates: ________________________
Is or was an investigation and remedial action conducted? Y/N *If yes, enter required information into Table I-4.*

Is this area or facility treated with pesticides? Y/N/U Inside? Y/N ; Outside? Y/N ; What types?
____
Are/have they been applied according to manufacturer's directions? Y/N/U; Application personnel: (*Installation personnel, Outside contractor*)

WASTE WATER

How is sewage disposed? (*Sanitary sewer, Septic system, Treatment system*)

Are any liquid wastes, wastewaters, or process cooling waters discharged to the sewer system? Y/N If yes, What are the constituents in the waste or wastewater? ____
____;
Can you provide testing documentation and permit information? Y/N If yes, Document IDs: ___________

Are there any drains or abandoned drains onsite? Y/N If yes, where?: ____________________________;
What drains into them? ____;
Where do they discharge to? ____;
What possible chemicals or petroleum products drain into them? ____________________________________

Are there any sumps or dry wells in this area/facility? Y/N If yes, What is discharged into it? _________
____
When was it installed? _______________; Abandoned? Y/N; When? ___________; Is or was an investigation and remedial action conducted? Y/N *If yes, enter required information into Table I-4*

Installation Code: ________; Area: ___________________; Parcel: _________; Facility Number: ______
Team Member Name: ________________________________; Date: ____________
Interviewee: ____________________________

COMPLIANCE ISSUES

Has an asbestos survey been performed? Y/N If yes, when? __________; Can you provide a copy of the survey? Y/N If yes, Doc. ID: _________; Did the survey identify any ACM? Y/N If yes, where?
____
Was the asbestos removed? Y/N ; If yes, when? ____________

Has a lead-based paint survey been performed? Y/N If yes, when? __________; Can you provide a copy of the survey? Y/N If yes, Doc. ID: _________; Did the survey identify any lead-based paint onsite? Y/N; Was the paint removed? Y/N ; When? ________

Has a radon survey been performed? Y/N If yes, When? __________; Can you provide a copy of the survey? Y/N If yes, Doc. ID: _________; Was radon detected above regulatory levels? Y/N Have mitigation actions been instituted? Y/N ; When? ____________

Has the potable water supply been tested? Y/N If yes, can you provide the test results? Y/N
If yes, Doc. ID: ___________
Process Water Supply: (*Installation, City, County, Facility well, River, Other:* _____________);

Are there any PCB-containing equipment other than transformers in this area/facility? Y/N If yes, can you provide a list identifying the status of each and a map locating all identified locations? Y/N If yes, Document ID: __________; If no, Map ID:______________; Coordinates: ___________________;
Are any of these investigation or cleanup sites? Y/N *If yes, enter required information into Table I-4*

Are there any transformers in the area or facility? Y/N If yes, Can you provide a list and a map of them? Y/N If yes, Document ID:____________; If no, list: Map ID:_____________;
Pole No.___________; Coordinates: ____________;
Pole No.___________; Coordinates: ____________;
Pole No.___________; Coordinates: ____________;
Have these transformers been inspected and tested? Y/N If yes, Can you provide documentation? Y/N If yes, Document ID: ________; Are any of these investigation or cleanup sites? Y/N *If yes, enter required information into Table I-4.*

Where is transformer retrofitting conducted? ______________________; Does the installation have a storage site for PCB wastes? Y/N If yes, Facility: ________; Map ID: _______; Coordinates: _________

Are or have there been air emissions from this installation/facility? Y/N If yes, can you provide a copy of the permit(s) and a complete list of all sources and a map locating the historical and present sources? Y/N If yes, Doc. ID: _____; If no, Describe: ____;
____

Installation Code: ________; Area: ___________________; Parcel: __________; Facility No: _________
Team Member Name: ________________________________; Date: ____________
Interviewee: ____________________________

Is the facility under a consent order, compliance schedule, or ever received a Notice of Violation for air emissions? Y/N ; If yes, Explain: ____
____

INVESTIGATION AND CLEANUP ACTIVITIES

Describe any past or present investigation or cleanup sites in this area or associated with this facility.

TABLE I-4: INVESTIGATION AND CLEANUP SITES

SITE ID	NAME	CONTAMINANTS	STATUS/ ACTIVITY	DOC ID MAP ID	MAP COORD.

Installation Code: ________; Area: ___________________; Parcel: __________; Facility No: _________
Team Member Name: ________________________________; Date: ____________
Interviewee: ____________________________

MISCELLANEOUS

Are there any pipelines located in this area/facility? Y/N If yes, sketch in approximate location(s). Map ID: ___________; Coordinates: ______________; Size:_________; Construction: __________; Contents:______________; Pressure tested? Y/N Date of last test: _________; Has it leaked? Y/N If yes, Is or was an investigation and remedial action conducted? Y/N *If yes, enter required information into Table I-4*.

Have there been any demolition activities in this area or in relation to this facility? Y/N If yes,
What was demolished?
____
Where was it located? Map ID:______________; Coordinates: ____________________
Where was the demolition wastes disposed? Map ID:______________; Coordinates: ______________
Use Table I-2 to describe the demolished facility's use history.
Were there associated USTs or ASTs? Y/N/U *If yes, enter required information into Table I*-3.
Is or was an investigation and remedial action conducted? Y/N *If yes, enter required information into Table I-4*.

Are there any pending, threatened, or past litigation, administrative proceedings, or notices from any governmental entity regarding any possible violation of laws or possible liability relating to hazardous substances or petroleum products in, on, or from the area or facility? Y/N Explain: _________________
____
____;
Can you provide documentation? Y/N If yes, Document ID: _________

APPENDIX D

SAMPLE VISUAL INSPECTION FORM

FORM 4 - VISUAL INSPECTIONS

Team Member Name: ________________________________; Date: ____________
Installation Name: ____; Installation Code: ________
Area: __________________________; Parcel: ________; Facility No. ____________;
Facility Name: ________________________; Map ID: ____________; Coordinates: _________________
Address: ____
Area/Facility Use: (*Undeveloped, Agriculture, Housing, Recreation, Commercial, Utilities, Light Industrial, Heavy Industrial, Other:*____________________); Acreage: ________;
Associated IRP Site, SWMU, or OU? Y/N/U ; If yes, Site ID(s): _______________________________
Area/Facility contact name/title: __________________________________; Phone: _______________

Escort Information:
Name:_____________________________; Organization: ______________; Title: __________________
Role/Responsibility: _______________________________________; Phone: _____________________;
Period for which the person would have specific and detailed knowledge of the area or facility in question:
____

Inspection Information:
Methods used to observe area or facility: (*Air, Auto, Walk, Onsite, Remote:* ___________________)
Inspection Complete? Y/N If no, explain: ____
____

Setting:
Adjoining land use (show on map): ____
____
Roads without outlets? Y/N ; Describe use: ____
Wetlands, Streams, Springs/seeps?: Y/N (delineate on map as W, S, SS, respectively);
Surface Cover: (*Vegetation, Manmade; Type:* _____________);

Construction:
Structure: (*Metal frame, Wood frame, Concrete*);
Siding (*Metal, Wood, Concrete, PVC, Other*______________);
Flooring Material: (*Wood, Concrete, Ceramic, Vinyl*);
Roofing Material: (*Composition, Sheet Metal, Tar, Tiles, Slate, Cedar Shake, Rubberized, Fiberglass*)
Insulation Material: (*Fiberglass, Foam, Unknown*)

Facility Utilities:
Heating/Ventilation/Cooling (HVAC) System: (*Oil/forced air, Gas/forced air, Electrical, Steam, Hot water*);
HVAC Power: (*Gas, Oil, Coal, Electric*); Backup Power Supply? Y/N;
Boiler Room? Y/N; Exhaust System? Y/N

Use History:
Describe in Table I-2 additional information regarding the use history of this area or facility discovered during the visual inspection that was not already described during interviews.

Installation Code: ________; Area: ___________________; Parcel: __________; Facility No: _________
Team Member Name: ________________________________; Date: ____________

FEATURES (Circle each form used. Use the appropriate form listed below.)

FORM V1: STORAGE TANKS: ASTs, USTs, Oil/Water Separators
FORM V2: HAZARDOUS SUBSTANCES AND/OR PETROLEUM PRODUCTS USED OR GENERATED, AND THEIR STORAGE AND DISPOSAL (except for USTs and ASTs).
FORM V3: POTENTIAL RELEASES: As indicated by stains, pools, stressed vegetation, odors, burned areas, illicit dumping and other uncontrolled waste.
FORM V4: WASTE WATER: Occurrence and disposition, including storm water, cooling water, waste water from processes, facility floors, oil-water separators, sumps, dry wells, etc.
FORM V5: PIPELINES
FORM V6: TRANSFORMERS: inventory, including capacitors.
FORM V7: PONDS: Including infiltration ponds, waste water treatment reservoirs, etc.
FORM V8: AIR EMISSIONS: Including incinerators, boilers, process, or laboratory exhaust.
FORM V9: POTENTIAL ASBESTOS CONTAINING MATERIALS
FORM V10: WELLS: Including drinking water, process water, agricultural, monitoring, injection, oil, and gas.

PHOTOGRAPHS

Frame Number Compass View Subject
____
____
____
____
____
____
____
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____
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APPENDIX E

ENVIRONMENTAL TITLE HISTORY REPORT